NATIONAL AERONAUTICS AND SPACE ADMINISTRATION

MANNED SPACECRAFT
CENTER

NASA ->

Houston 1, Texa:

483-5111

December 10, 1969

Houston, Texas --- A preliminary examination of the Apollo 12

Lunar Module television camera which stopped transmitting a usable

picture from the lunar surface indicates there are no mechanical or

electronic failures. The preliminary examination here indicates the

top portion of the tube is burned.

The camera's TV tube will be sectioned in a vacuum atmosphere, then undergo extensive analysis at the Westinghouse tube plant at Elmira, New York. A report on the tube is expected in approximately 2 weeks...

As part of the preliminary examination, the automatic light control circuit was interrupted by cutting a wire. After the circuit was disabled, a picture was visible on the lower half of a monitor, indicating the lower part of the tube was functioning.

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NATIONAL AERONAUTICS AND SPACE ADMINISTRATION

MANNED SPACECRAFT
NASA

483-5111

HOUSTON
MSC 69-#1-\$1

December 23, 1969.

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HOUSTON, TEXAS--One hundred and forty-two U. S. and foreign scientists will present results of their detailed analysis of Apollo 11 moon samples at the Lunar Science Conference to be held in Houston, Texas January 5-8, 1970.

The scientists, representing industry, university and government laboratories throughout the world, have been examining for the past three months more than 1,300 separate moon samples returned in America's first lunar landing on July 20, 1969. The four day conference represents the largest gathering of lunar scientists at what is the most significant meeting in the 11 year history of the National Aeronautics and Space Administration.

Approximately 1,000 scientists, university, and government officials are scheduled to attend the Lunar Science Conference which will be held at the Albert Thomas Exhibit and Convention Center in downtown Houston. The list of invitees, in addition to the 142 lunar sample principal investigators and their co-workers, includes outstanding national and international scientists, the President's Science Advisory Committee, members of the National Aeronautics and Space Council, university representatives, members of lunar and planetary subcommittees, Lunar Science Institute officials, and Federal, state, and local officials.

-more-

The first day of the conference will be a general session covering selected scientific disciplines, followed on succeeding days by two parallel sessions organized by discipline. Invitees and principal investigators are expected to attend the general sessions and the parallel sessions are expected to draw 400 to 600 per meeting.

The parallel sessions will be divided into the following disciplines: Mineralogy, Analytical Chemistry, Physical Properties, Isotopes, Cosmic Ray and Solar Wind, and Organic Chemistry. The daily sessions are scheduled to begin at 9:00 a.m. and conclude by 5:30 p.m.

Samples from Tranquility Base collected by the Apollo 11 crew were distributed to 106 principal investigators in the United States and 36 in eight other countries. (Australia, Belgium, Canada, England, Finland, Germany, Japan, and Switzerland). Distribution of approximately 18 pounds of rocks, fines, and thin sections—about one third of the Apollo 11 lunar material—was made on September 12, 1969, following a 50-day preliminary examination at the Lunar Receiving Laboratory (LRL) at the NASA Manned Spacecraft Center, Houston.

The preliminary examiniations conducted at the LRL in Houston disclosed the Tranquility Base samples were of two basic rock types: (1) compacted lunar soil, and (2) igneous rocks. The preliminary examination revealed that rocks had been lying on the lunar surface for 10-150 million years and that the igneous rocks crystallized from 3-4 billion years ago.

The principal investigators along with their co-investigators are scheduled to report on their 90-day study of almost every type of measurement that has been made on terrestrial igneous rocks or meteorites. The principal types of measurements made by the scientists are:

- 1. Mineralogy and petrology which includes the study of the mineral content of the rocks and compositions of these minerals. These studies will show how much water was present when the rocks crystallized or were formed on the lunar surface. The study will also show how surfaces were eroded by particles.
- 2. Measurements of physical properties of rocks and soil. These data will help in understanding optical observations of the moon from earth as well as future seismic experiments. Studies of microscopic fission tracts and cosmic ray induced tracks will help us understand the radiation history of the moon.
- 3. Studies of the chemical composition of the rocks and fines. These studies will determine the concentration of virtually every one of the 92 elements that occur on earth and in meteorites. Determinations of isotopic compositions of strontium lead, and the rare gas elements (Ne, Ar, Kr, and Xc) will determine the times of crystallization of the igneous rocks and the times that rocks have lain on the lunar surface. Studies of the rare gases in the soil will also furnish the first data on isotopic compositions of solar materials.

MSC 69-71 Add 3

Biologists and organic chemists will determine the structures and relative abundances of compounds of carbon indigenous in, and deposited on, the lunar surface; determine the origin of the indigenous carbon compounds; catalog microstructures in terms of organized elements and microfossils; and define the presence or absence of viable lunar organisms.

NATIONAL AERONAUTICS AND SPACE ADMINISTRATION

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MSC 70-1

January 2, 1970

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HOUSTON, TEXAS--Sigurd A. Sjoberg was named Director of Flight Operations of the Manned Spacecraft Center effective December 28, 1969.

Sjoberg assumes his new duties after having served as Deputy Director, Flight Operations since October 1963. He succeeds Dr. Christopher C. Kraft, Jr., who was recently appointed Deputy Director of MSC.

Since joining MSC in October 1959, Sjoberg has held successively responsible operations positions. He joined NACA (National Advisory Committee for Aeronautics), NASA's predecessor in 1942 as an aeronautical engineer.

As Director, Sjoberg will be responsible for the management and direction of four organizational divisions within FOD. This directorate is responsible for mission planning and for overall direction of flight control and recovery activities associated with all NASA manned space flight activities.

Sjoberg was born in Minneapolis, Minnesota in 1919. He holds a BS degree in Aeronautical Engineering from the University of Minnesota, 1942. He received the MSC Superior Achievement Award, November 1966; NASA Exceptional Service Medal, January 1969; and NASA Exceptional Service Medal, October 1969.

He is a member of the American Institute of Aeronautics and Astronautics and is the United States representative to Federation Aeronautique Internationale (FAI), Paris, France.

Sjoberg is married to former Elizabeth Jane Ludwig. They have three children: Eric Sigurd, 21; Stephen Lee, 19; and Robert John, 15. The Sjobergs reside in Seabrook, Texas.

NATIONAL AERONAUTICS AND SPACE ADMINISTRATION
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January 6, 1970
MSC 70-2

BEH

HOUSTON, TEXAS--The National Aeronautics and Space Administration has awarded a letter contract to AC Electronics Division of General Motors Corporation to provide for primary navigation, guidance and control system support for the Command Modules and Lunar Modules for the Apollo Program.

The contract was effective January 1, in the amount of \$3 million to be definitized by April 30, 1970. A cost-plus-award-fee definitive contract is contemplated.

Under the proposed contract, AC Electronics will be responsible for analysis of Guidance and Navigation Hardware and Software problems, perform any required retrofit and/or modifications; manage and operate the Guidance and Navigation Labs at the various field sites; perform a complete checkout and test for all Primary Navigation, Guidance and Control Systems; and analyze, repair, and test failed Guidance and Navigation Airborne Hardware and Ground Support Equipment.

This is a continuation of the services previously performed for the Manned Spacecraft Center by AC Electronics Division in connection with the manufacturing and testing of Primary Navigation, Guidance and Control Systems Hardware.

The majority of the work will be performed by AC Electronics at their Milwaukee, Wisconsin facility.

NATIONAL AERONAUTICS AND SPACE ADMINISTRATION MANNED SPACECRAFT CENTER 1, Texas

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January 6, 1970 MSC 70-3

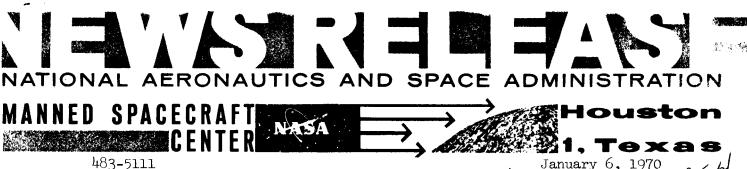
HOUSTON, TEXAS--The National Aeronautics and Space Administration has awarded a letter contract to The Boeing Co. to provide Systems

Engineering and Assessment for the Apollo Spacecraft Program.

A letter contract was awarded to The Boeing Co. effective January 1, 1970 in the amount of \$3 million to be definitized by March 31, 1970. A cost-plus-fixed-fee definitive contract is contemplated.

Under the proposed contract, Boeing will provide an integrated assessment of spacecraft and subsystem flight readiness to the Apollo Spacecraft Program Manager, related special studies, and safety engineering analysis of manned spacecraft subsystems and hardware, including modifications to Apollo type hardware utilized in extended Command and Service Module and Lunar Module Missions (CSM's through 119 and LM's through 15).

The majority of the work will be performed by The Boeing Co. at their Houston, Texas facility.



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HOUSTON, TEXAS -- The National Aeronautics and Space Administration has awarded a letter contract to the Raytheon Co. to provide 250 Fixed Memory Modules to be used in the Guidance Computer of the Command Module and Lunar Module in support of the Apollo Program and Apollo Applications Program.

The letter contract was effective January 1, 1970 in the amount of \$1,000,000 to be definitized by April 30, 1970. A cost-plus-incentivefee definitive contract is contemplated.

Each guidance computer, located in each spacecraft contains six fixed memory modules. The fixed memory modules are fabricated to the specific requirements of each mission, and therefore each set of modules is unique.

The majority of the work will be performed by the Raytheon Co. at their Waltham, Massachusetts facility.

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January 6, 1970 BE4 MSC 70-5

HOUSTON, TEXAS--Three astronauts have been grounded from aircraft flying for 30 days for violations of NASA flying regulations. The groundings were ordered by Donald K. Slayton, Director of Flight Crew Operations.

The astronauts are Alan Bean, Walter Cunningham and Joseph Kerwin.

On December 16, through a communications misunderstanding, Bean took off from Ellington Air Force Base, Texas without a departure release, although he thought he was cleared for takeoff.

On December 17, Cunningham and Kerwin, in separate flights from Ellington, violated a regulation requiring them to list a suitable departure alternate airport before takeoff.

The groundings are normal action taken by all flying organizations in such cases.

They will be returned to flight status January 23.

NATIONAL AERONAUTICS AND SPACE ADMINISTRATION

MANNED SPACECRAFT

CENTER

January 7, 1970

MSC 70-6

RELEASED BY NASA HEADQUARTERS

The National Aeronautics and Space Administration has signed a supplemental agreement with Hamilton Standard Division, United Aircraft Corporation, Windsor Locks, Connecticut valued at \$5,461,203 for changes in the Apollo portable life support system (PLSS) contract.

The agreement formally incorporates into the contract changes permitting the PLSS to accept an improved communications system supplied by NASA. The communications system was developed under a separate contract with the Radio Corporation of America to permit two astronauts to work simultaneously outside the spacecraft on the lunar surface.

The contract provides for addition of a carbon dioxide sensor to the portable life support system beginning with the Apollo 14 mission. It also incorporates previous modifications to ground support equipment and requalification of the system completed prior to Apollo 11 for increased vibration and thermal conditions.

The Apollo portable life support system is built by Hamilton Standard at its Windsor Locks facility. The supplemental agreement increases the total estimated value of the Hamilton Standard PLSS contract to \$53,172,186.

NATIONAL AERONAUTICS AND SPACE ADMINISTRATION
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January 7, 1970 MSC 70-7 BE4

HOUSTON, TEXAS--The Interagency Committee on Back Contamination informed the National Aeronautics and Space Administration today that the Apollo 12 lunar samples and Surveyor parts may be released to principal investigators.

Lifting of quarantine was effective at 11:00 a.m. CST. The first release of samples to Apollo 12 principal investigators is expected to begin about the first week of February. The Lunar Sample Planning Team will meet next week and prepare a distribution plan for the Apollo 12 samples.

The Surveyor camera parts will first undergo radiation and biological testing at the Lunar Receiving Laboratory at the Manned Spacecraft Center before they are released next week to scientists at the Jet Propulsion Laboratory.

AERONAUTICS AND SPACE ADMINISTRATION MANNED SPACECRAFT Houston January 8, 1970 BE4 ole

RELEASED BY NASA HEADQUARTERS

483-5111

HOUSTON. TEXAS -- The National Aeronautics and Space Administration announced today that the Apollo 13 manned lunar landing mission scheduled for launch March 12 has been rescheduled to April 11.

The Fra Mauro highland area located at 17 degrees. 35 minutes, West and 3 degrees, 48 minutes, South, remains as the primary landing site.

The landing sites and mission objectives of the Apollo Program are inter-related, with each mission playing a vital role in the accomplishment of the overall goal of lunar exploration. With the prospective of lowering the rate of Apollo flights, the movement of Apollo 13 to April allows additional time for more detailed analysis of specific mission plans. Follow-on launches beyond April 13 are being analyzed to optimize the interval between launches for both operations and scientific return.

Apollo 14 manned lunar landing mission scheduled for July will be rescheduled for the fall of 1970.

NATIONAL AERONAUTICS AND SPACE ADMINISTRATION MANNED SPACECRAFT NASA January 16, 1970 MSC 70-10 JELY

Houston, Texas --- Surveyor III spacecraft parts, returned to earth by NASA Apollo 12 astronauts, were released today from the MSC Lunar Receiving Laboratory here for detailed study to determine effects of $2\frac{1}{2}$ years of exposure to the environment of the moon.

Scientists and engineers at JPL, Pasadena, California, and Hughes Aircraft Company, Culver City, California, and other institutions will study the effects of prolonged exposure to radiation, thermal cycling, vacuum environment, and micrometeorites on the moon.

After the initial survey of the samples is complete, system performance tests of the electrical and mechanical parts of the Surveyor III TV camera will be conducted. If the electrical systems are operational, the circuits will be examined for physical or electrical performance changes.

The microcircuitry will be examined by Hughes Aircraft for evidence of change in color, electrical performance, and corrosion. If electrical systems are not operational, the specific failures will be identified. This task will be performed by the Jet Propulsion Laboratory. Soil mechanics tests will also be conducted.

Both metallic and nonmetallic materials will be investigated to determine what changes have taken place during the $2\frac{1}{2}$ years exposure to the lunar environment. Metallic and nonmetallic materials will be investigated to determine the source (radiation, heat, vacuum, or a combination) of changes, if any, and the mechanisms by which it occurred.

Such information is necessary in predicting the behavior of these materials for longer periods of lunar exposure as well as possibly predicting the behavior of other materials in the same environment. The TV camera will be among the items used for the Hughes test. Thermaloptics measurements will be reviewed for evidence of molecular change. Other spectroscopic techniques, such as infrared and supplementary visible and ultra-violet also may be necessary. This task will be performed by Hughes Aircraft Company under contract to MSC.

Before disassembling, the TV camera and the camera case will be tested to determine performance of the seals and be examined for evidence of cold molecular welding, sputtering, and general surface changes. Sputtering and micrometeoroid impact can be identified by examining the surfaces microscopically. An indication of the importance of cold molecular welding may be obtained by comparing the torque necessary to remove selected screws or bolts on various items to original specification values. An examination of the metal fastner surfaces should also determine whether cold molecular welding is important. Dimensional measurements of selected items such as magnesium, zinc, or other materials that may be volatile in a thermal vacuum environment will be made.

The camera lens will be examined to determine degradation, if any, in its optical properties as a result of the extended exposure to the lunar environment. The test will consist of visual inspection for gross changes and measurement of transmissibility for more subtle effects.

The painted aluminum tube, a portion of the Teflon obtained from Surveyor III, and selected TV camera parts will be tested to provide information for the design of future spacecraft. The test will include:

- a. All external thermal control coating surfaces
- (1) Inspection (portable devices for emittance, absorptance)
 measurements to establish the range and contours of the thermal property
 characteristics of the parts.
- (2) Spectral reflectance and/or transmittance of selected parts from all surfaces from 0.25 to 25 microns. This is the spectral range of interest for thermal properties.
- (3) Visual and scanning electron microscopic examination of all exterior surfaces for exposure effects including meteoroid impact, sputtering, and lunar debris adhesion.
 - b. Mirrors, Teflon, and Kapton
 - (1) Specular and diffuse reflectance 0.25 to 25 microns
- (2) Spectral transmission as appropriate, (i.e., if metallized surface is absent), and possibly determination of optical constants such as index of refraction.
 - c. Section of polished metal tube

Extensive reflectance measurements of selected areas to establish the magnitude and nature of surface errosion.

d. TV camera, TV support tube supporting experiments will be required to determine the nature and magnitude of atmospheric bleaching (if any) of white paint.

A micrometeoroid investigation will examine the flux, composition, mass, velocity, and similar properties of primary particles and secondary ejecta associated with the lunar environment. Photographs of the particle accumulation on Surveyor Pad III, the Klystron Power Supply, and top of compartments A or B or the TV mirror will be analyzed for data on the ejecta formation rate and size distribution.

Surfaces of the unpainted aluminum tubing and the TV camera will be optically scanned at MSC at a 20K magnification to permit a mapping or crater distribution study for sizes down to 50 microns. Areas showing particular impact evidence will be examined at a 200X magnification to note sizes down to 5 microns.

The TV camera has been forwarded to Hughes Aircraft for subsequent disassembly and distribution. If craters with indications of impact residue have been detected in the unpainted aluminun tubing, selected craters will be sectioned from the tubing in the Meteoroid Science Branch, and the other portions of the tubing distributed to JPL and to the MSC Geology Branch. The undistributed sections will be retained for electron-microprobe or neutron activation analysis.

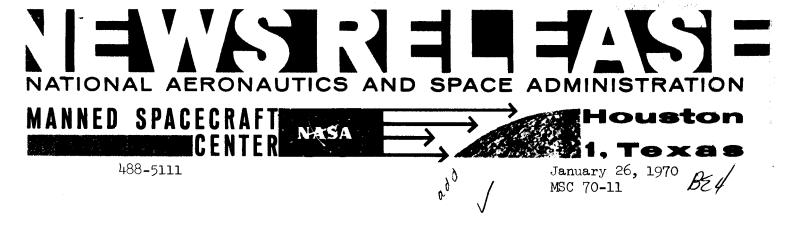
The unpainted and the painted aluminum tubing will be used for a solar wind composition investigation. Extensive measurements of noble gas ions with solar wind velocities have shown that aluminum and aluminum oxide give very high and reproducible trapping efficiencies.

The material is to be heated and melted, releasing the embedded solar wind and solar flare gases. These gases are to be purified and separated into five fractions: Hydrogen (for the tritium measurement); HeNe; Ar; Kr; and Xe.

A surface radioactivity investigation will examine the $2\frac{1}{2}$ year accumulation of surface radioactivity on the Surveyor III spacecraft to obtain information on radon concentration in the lunar atmosphere, rates of diffusion of radon from the lunar surface, and average uranium concentration integrated over a large area of the lunar surface.

A sample will be placed in a small vacuum chamber, facing a gold-silicon alpha-particle detector. The sample will be kept at room temperature and at approximately a 1-micron pressure. Depending on the level of activity, a period from a few hours to a few days may be required to complete the measurements.

A soil mechanics investigation to be conducted is restricted to the soil remaining in the Surveyor III scoop. Objectives include comparison of soil mechanical properties, particle size, and albedo with measurements made during actual Surveyor III operations on the same material. These comparisons will aid in understanding these properties and in evaluating techniques used for remote measurements in future unmanned space probes.



HOUSTON, TEXAS--The National Aeronautics and Space Administration, Manned Spacecraft Center, has awarded a \$5.1 million contract to Itek Corporation, Lexington, Massachusetts for high resolution panoramic cameras to be used for lunar photography on future Apollo missions.

The cameras are planned as part of the orbital experiments package for Apollo missions 16, 17, and 18. They will be used to obtain pictures of potential lunar landing sites and exploration areas, and to provide detailed maps of areas which were not covered in high resolution Lunar Orbiter photographs.

Under the contract Itek will supply six 24-inch-focal-length "optical bar" panoramic cameras designed for automatic, remote operation in an equipment bay of the Apollo service module. Four of the six cameras will be flight qualified. Two will be used for development and qualification testing. In addition, Itek will provide two mockups and three training models of the camera.

The camera will take nearly 1,500 stereographic or conventional photographs on a roll of film. The individual photographs will be about 4.5 inches high and almost four feet long, covering a field of view 108 degrees wide. It is expected that photographs taken 60 miles above the moon will show surface features as small as 54 inches in diameter.

Add 1 MSC 70-11

Since the eamera will be carried in the Apollo service module it will be necessary for one of the astronauts to go outside the communic module and retrieve the film magazine before the spacecraft modules separate for earth entry.

A number of modifications must be made to the current production model of the Itek camera to adapt it to space use. Components will be upgraded to withstand launch vibrations; thermal changes will be required to prevent the temperature extremes of space from damaging the film; other changes will make the camera compatible with the spacecraft and its electrical system; and the camera's film cassette will be modified to simplify retrieval.

The first flight qualified camera is scheduled for delivery in August, and the remaining three flight qualified units are to be delivered by the end of 1970.

Itek builds the panoramic camera at its Optical Systems Division in Lexington.

NATIONAL AERONAUTICS AND SPACE ADMINISTRATION MANNED SPACECRAFT LEASA January 23, 1970 MSC 70-12 AC J

HOUSTON, TEXAS--The ALESP 1 system continues its satisfactory performance, after more than 64 days of uninterrupted operation. Scientific data is being transmitted continuously from the seismometer, the magnetometer, the suprathermal ion detector, and the solar wind spectrometer experiment sensors. Engineering data is being transmitted from the central station and all experiments are indicating operational status within expected limits.

Power from the radioisotope source remains constant at 74 watts. To date, 1977 commands have been transmitted to and implemented by ALSEP 1 since being deployed on the lunar surface.

The Passive Seismic Experiment recorded an episode of large tilts on the long-period horizontal sensors lasting approximately one hour and coinciding with the third lunar sunrise at the ALSEP 1 site, which occurred on January 16, 1970.

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NATIONAL AERONAUTICS AND SPACE ADMINISTRATION

MANNED SPACECRAFT NASA HOUSTON

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January 26, 1970
MSC 70-13

HOUSTON, TEXAS--The National Aeronautics and Space Administration will conduct a panel discussion, "On the Role of Clinical Pathology in Manned Exploration of Space," on February 12 when the American Society of Clinical Pathologists meets at the Manned Spacecraft Center.

Approximately 450 clinical pathologists from the U.S. and Canada are scheduled to attend the afternoon panel discussion which will be held in the Building l auditorium. Dr. Craig L. Fisher, Pathologist and Chief Clinical Laboratories at MSC, is program chairman.

MSC doctors and the titles of their presentations are: Dr. C. L.

Fisher, "Role of Clinical Pathology in the Manned Exploration of Space;"
Dr. W. C. Alexander, "Organization and Functional Responsibilities of
the Clinical Laboratories;" Dr. C. H. Walkinshaw, "Effects of Lunar
Material on Selected Plant Systems;" Dr. N. D. Jones, "Effects of
Lunar Material on Various Species of Animals;" Dr. S. L. Kimzey,

"Advanced Technique for Retrospective Analysis of Blood Samples
Acquired in Flight;" Dr. C. S. Leach, "Endocrinologic Consequences
of Manned Space Flight;" Dr. C. L. Fisher, "Clinical Laboratory

Findings - Projects Gemini and Apollo;" Dr. Tate Minckler, "Laboratory
and Medical Data Management as Applied to the Manned Flight Program."

NATIONAL AERONAUTICS AND SPACE ADMINISTRATION Hous 483-5111 January 28, 1970 ہئر

HOUSTON, TEXAS -- Astronauts James A. Lovell and Fred W. Haise, Jr., will have the "down to earth" luxury of a drink of water if they become thirsty while exploring Fra Mauro craters during Apollo 13 flight in April.

MSC 70-14

An eight ounce water bag will be attached to the inside of the helmet. A tube will be attached to the bag permitting the astronaut to take a drink just by moving his head and sipping on the water tube. The five by three inch plastic water bag will be filled with water from the Lunar Module prior to the start of the first extravehicular activity and then may be refilled upon the crew's return to the LM.

Apollo 12 astronauts Charles "Pete" Conrad and Alan L. Bean reported they became thirsty during their exploration of the Ocean of Storms last November. Conrad said they filled up on water before leaving the Lunar Module but they "got thirsty when we made our long run from Sharp Crater all the way up to Halo Crater."

Conrad suggested provisions be made for drinking water inside the Apollo pressure suit for future lunar exploration flights. Conrad said "the addition of a little water, which would not be much trouble on the suit, would take care of that point."

The Crew Systems Division at MSC developed the water bag concept. Whirlpool Corporation is fabricating the plastic water bags.

The water bag will be mounted on the right-center front inside the ring of the extravehicular helmet. It will be attached by a Velcro fastner to the inside of the helmet neck ring.

Another change resulting from Apollo 12 comments is the addition of a sunshade in the middle portion of the helmet rim. Astronaut Conrad suggested the additional visor after experiencing difficulty with sun glare during his EVA.

The new visor is attached to outer portion of the Lunar Extra Vehicular Visor Assembly (LEVVA).

NATIONAL AERONAUTICS AND SPACE ADMINISTRATION MANNED SPACECRAFT MASA HOUSTON

483-511.1

HOUSTON, TEXAS--Several organizational changes have been made within the Science and Applications Directorate to enhance the Manned Spacecraft Center's scientific research capability and improve the implementation of science programs.

Science Director Anthony J. Calio, in announcing the changes, said the realignment of the Directorate places increased emphasis on lunar science and earth resources. Included in the reorganization is the appointment of a Deputy Director, the establishment of three new offices:

Lunar Missions Office, Earth Orbital Missions Office and Mission Scientists Office; and the realignment of two divisions: Earth Resources Division and Lunar and Earth Sciences Division.

Named to the post of Acting Deputy Director for Science and Applications is Robert O. Piland, 42. Piland, who has been with the NASA for 23 years and has held several management positions at MSC, has most recently been Chief of the Earth Resources Division.

The Lunar Missions Office will provide a project management and mission planning focus within the Center for lunar scientific investigations and experiments. John Zarcaro, formerly of the Apollo Spacecraft Program Office, has been named Manager of the Office.

The Earth Orbital Missions Office will be responsible for program management, mission planning and operations focused on near-earth scientific investigations. Allen H. Watkins, formerly with the Earth Resources Division has been named Manager of the Office.

Scientist astronauts will be assigned on a mission basis to the newly created Mission Scientists Office, working closely with the Center's scientific elements. The astronauts will represent the Science Director at meetings, planning sessions, etc., and will act on behalf of the Science Directorate. These assignments will be in addition to the astronauts' regularly assigned duties.

Scientist Astronaut Anthony W. England is assigned as Mission Scientist for Apollo 13 and Scientist Astronaut Philip K. Chapman, Mission Scientist for Apollo 14.

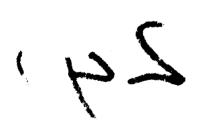
Research in the fields of geology, geochemistry and geophysics will be expanded in the realignment of the Lunar and Earth Sciences Division. To implement this program, Mr. Calio announced the appointment of Dr. Paul Gast to the position of Chief of the Lunar and Earth Sciences Division.

Dr. Gast, a leading lunar geologist and Professor of Geology at Columbia University, New York, has been a member of NASA's Lunar Sample Analysis Planning Team for Apollo 11 and 12. Dr. Gast will make significant contributions to the scientific planning of Apollo missions and will be responsible for carrying out a major portion of the Center's research in lunar sciences.

The Lunar Receiving Laboratory is now established as a separate organizational element. Through the Apollo 12 mission the LRL was a part of the Lunar and Earth Sciences Division. Bryan Erb who was Acting Manager is now Manager of the LRL.

Add 2 MSC 70-15

The Earth Resources Division, which for the past several years has been conducting the aircraft survey program, has been redesignated the Earth Observations Division. Mr. Piland, while serving as Acting Deputy Director to Mr. Calio, will also temporarily serve as Chief of the Division.



NATIONAL AERONAUTICS AND SPACE ADMINISTRATION MANNED SPACECRAFT Houston

483-5111

70-16 January 28, 1970

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Houston, Texas---Representatives of the U.S. and 21 foreign countries which are members of the U.N. Committee on the Peaceful Uses of Outer Space will receive a briefing Thursday and Friday on NASA's Earth Resources Program at the Manned Spacecraft Center.

Ambassador Heinrich Haymerle of Austria, who is chairman of the U.N. committee, heads up the contingent of approximately 60 U.S. and foreign representatives. Accompanying the group will be Ambassador Charles W. Yost, U.S. permanent representative to the U.N., NASA Deputy Associate Administrator for Space Applications Leonard Jaffe, and NASA Assistant Administrator for International Affairs Arnold Frutkin.

The U.N. group, which includes 19 U.S. and foreign ambassadors, is scheduled to receive a review of the Earth Resources Program, a tour of the earth resources aircraft, data and research facilities at Ellington Air Force Base, Buildings 222 and 358.

The group is scheduled to land at Ellington about 12:00 noon aboard a U.S.A.F. aircraft. The briefings will begin at 1:00 p.m. and run through the remainder of the day, with side tours to the Mission Control Center and the Lunar Receiving Laboratory. Tours of flight and research facilities will begin at 9:00 a.m. Friday. The U.N. representatives are scheduled to depart for New York at 12:00 noon Friday.

Committee members tentatively scheduled to attend the 2 day
briefing are Cuillermo J. McCough, First Secretary, Argentina; Ambassador
Patrick Shaw, Australia; Ambassador Haymerle, Austria; Counsellor Jean
Debergh, Belgium; Ambassador Joso Augusto de Araujo Castro, Brazil;
Ambassador Milko Tarabanov, Bulgaria; Mr. Rettie, Canada; Ambassador
Bruno Bohiadi, Chad; Ambassador Zdenek Cernik, Czechoslovakia; Ambassador
Armand Berard, France; Ambassador Karoly Csatorday, Hungary; Ambassador
Samar Sen, India; Ambassador Piero Vinci, Italy; Mr. Hisashi Owada,
Japan; Ambassador Edouard Ghorra, Lebanon; Ambassador Francisco Cuevas
Cancino, Mexico; Ambassador Mangalyn Dugersuren, Mongolia; Mr. Mohamed
Mah,joubi, Morocco; Ambassador Gheorghe Diaconescu, Rumania; Ambassador
Everker C. Astrom, Sweden; and Ambassador Abdullah El-Erian, United
Arab Republic. Members of the U.S. mission to the U.N. in the party
Include, in addition to Ambassador Yost, Ambassador William Buffum,
Ambassador Glen Olds, and Peter S. Thacher.

Members of the U.N. Secretariat staff and representatives of the U.S. State Department, Washington, and the U.S. mission to the U.N. are also scheduled to attend the briefings.

NATIONAL AERONAUTICS AND SPACE ADMINISTRATION
MANNED SPACECRAFT HOUSTON

483-5111

January 29, 1970 MSC • 70-176-

HOUSTON, TEXAS -- The NASA Manned Spacecraft Center has extended its contract with Service Technology Corporation, Houston for facility support services at the Center.

The cost-plus-award-fee contract represents the third year of an approved 5-year program initially awarded to LTV Aerospace Corporation, Range Systems Division, Dallas, Texas.

The 1-year extension is valued at approximately \$11.5 million and brings the total estimated value of the contract since December 1967 to \$34.8 million.

Service to be performed includes operations, maintenance, repairs, alterations, minor construction, and engineering, and drafting services for the Manned Spacecraft Center. The contract provides facilities support to all administrative operations and research and development programs at the Center.

NATIONAL AERONAUTICS AND SPACE ADMINISTRATION MANNED SPACECRAFT Houston

483-5111

70-18 January 29, 1970 BEY

Houston, Texas---A NASA accident investigation board has found that the pilot failed to lower his landing gear in a landing mishap that occurred August 25, 1969, at Ellington AFB.

NASA Staff Pilot Edwin Q. Rainey was not hurt in the incident. The T-33 jet aircraft he was flying received damages totaling about \$24,000, but it was not repaired because of its reduced value.

Rainey had completed a functional check flight with the aircraft and a series of four touch-and-go landings and was preparing to make a fifth landing to a full stop when the Ellington control tower warned that his landing gear was not down.

Rainey advanced his throttle, retracted his speed brakes, and attempted to go around for another landing approach. However, his air speed was too low and the aircraft contacted the runway before the engine could accelerate. The go-around was aborted and Rainey shut down the engine, bringing the aircraft to a stop on its belly and wing flaps.

The investigating board, headed by Astronaut Paul J. Weitz, said a possible contributing cause of the accident was the pilot's precocupation with an up-coming precision landing coupled with a report from the Ellington tower of another aircraft in the vicinity which may have distracted the pilot and broken his normal habit pattern.

70-18 Add 1

The board said, however, that final responsibility for the safe and proper operation of an aircraft rests with the pilot, and it recommended that no changes be made in standard operating procedures or aircraft equipment.

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NATIONAL AERONAUTICS AND SPACE ADMINISTRATION

MANNED SPACECRAFT NASA

483-5111

February 4, 1970 MSC 70-20

Houston

BE4

HOUSTON, TEXAS -- The NASA Manned Spacecraft Center announced a one-year extension of its contract with the Zia Company of Las Cruces, New Mexico, for maintenance and operations support to NASA's White Sands Test Facility, Las Cruces, New Mexico.

The estimated value of the one year extension is \$3,270,897 and brings the total value of the contract since November 1966 to about \$17.9 million.

Under terms of the cost-plus-award-fee contract, the Zia Company is responsible for maintenance, repair and operation of buildings, equipment, and systems; emergency fire protection; medical services for employees; electrical and mechanical engineering support; altitude simulation system support; administrative support of supply, warehousing, transportation and heavy equipment operation; and minor construction and alteration of facilities.

The contract extension extends the Zia Company's period of performance through January 1971.

The White Sands Test Facility provides major support services to NASA's Manned Spacecraft Center, Houston, in testing Apollo spacecraft propulsion systems, components and materials.

NATIONAL AERONAUTICS AND SPACE ADMINISTRATION

MANNED SPACECRAFT NASA 1, Texas

483-5111

70-21 February 5, 1970

A study to extend the operating life of the fuel cell has been requested of the Allis-Chalmers Corporation (A-C), Milwaukee, Wisconsin, by the NASA Manned Spacecraft Center.

MSC has asked A-C to investigate the application of the fuel cell system as the primary power supply for several advanced space missions, as well as the auxiliary power system for lunar surface bases and March orbital space stations.

Primary objective of the \$554,000 cost-plus-fixed-fee contract is to extend the lifetime of the fuel cell to a goal of 10,000 hours.

At the same time, the study will investigate ways to decrease system weight approximately 60 percent. Current fuel cells have a specific weight of 100 pounds per kilowatt hour. Reliable operation is between 1,000 to 1,500 hours. The study also calls for a system that can be re-used up to 100 missions.

In addition the system is to have stop and restart capability--in the event inflight maintenance is required.

The contact also calls for the fabrication and delivery of a small test module. Testing will be conducted at the Marshall Space Flight Center.

The study will run through July 31, 1970. It is monitored by MSC's Propulsion and Power Division.

NATIONAL AERONAUTICS AND SPACE ADMINISTRATION

MANNED SPACECRAFT

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483-5111

February 6, 1970

COLUMN

February 6, 1970

HOUSTON, TEXAS--NASA today selected the Service Technology Corporation of Dallas, Texas for the award of a contract for laboratory and technical support services at White Sands Test Facility, Las Cruces, New Mexico.

The cost-plus-award-fee contract will cover one year and the estimated contract value is \$3.5 million.

This contract will provide technical services for development testing and verification testing of space propulsion systems and related sub-systems associated with follow-on NASA Manned Spacecraft Center missions.

NATIONAL AERONAUTICS AND SPACE ADMINISTRATION
MANNED SPACECRAFT
HOUSTON

483-5111

February 10, 1970 MSC 70-23

HOUSTON, TEXAS--The National Aeronautics and Space Administration, Manned Spacecraft Center has invited 14 firms to submit proposals for an engineering study on a space environment in which the "average" person could work, sleep, eat, and relax comfortably and efficiently over long periods of time.

The objective of the study will be to prepare handbooks to be used as basic criteria for architectural design, compartment utilization, volume, lighting, acoustics, temperature, and color for extraterrestrial living environments. The handbooks will present standards setting maximum, minimum, and desired ranges.

The study will relate these standards to space stations with 6 to 100 crewmen, up to 400,000 cubic feet of volume and designed for missions lasting as long as 10 years; to logistic spacecraft with 2 to 12 crewmen, up to 10,000 cubic feet of room and an orbital stay time of seven days; and to planetary space vehicles with 6 to 12 crewmen, up to 30,000 cubic feet of volume and designed for missions lasting as long as 1,040 days.

The request for proposals notes that operating in new and strange environments is not new to man. Enormous amounts of data have been compiled to reflect the lighting, acoustics, temperatures and color

desirable to daily life. Additional information has been gathered from such sources as submarines, underwater oceanographic research facilities, Arctic and Antarctic stations and from spaceflight, where men have lived for long periods in confined environments.

The Manned Spacecraft Center plans to allot up to \$100,000 for the study. The seven month effort will be carried out under the direction of MSC's Engineering and Development Directorate.

Industry proposals for the study contract are to be submitted by March 9, 1970.

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MANNED SPACECRAFT Houston Tex

483-5111

February 13, 1970 MSC 70-24

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HOUSTON, TEXAS--Distribution of 28 pounds of Apollo 12 lunar material to scientists in the U.S. and 16 foreign countries has begun at the NASA Manned Spacecraft Center, Houston, Texas.

The material, in the form of rocks, chips, fine material and thin sections, is scheduled to be distributed to 139 U.S. and 54 foreign scientists. Distribution of the samples is to continue for the next several months.

The 28.6 pounds of material (13 kilograms) represents about 40 percent of the material collected from the Moon's Ocean of Storms by Apollo 12 astronauts Charles Conrad and Alan Bean in November 1969. bulk of the samples will be distributed to scientists through the mail and by diplomatic courier. Some scientists will travel to MSC to arrange for personal receipt of their sample.

There are 51 more scientists receiving Apollo 12 samples than the number of principal investigators who received samples from the first lunar landing. Eighteen pounds of Apollo 11 samples were distributed to 106 U.S. scientists and 36 scientists representing eight foreign countries last September.

The domestic scientific analysis will be performed in 139 university, industrial and government laboratories in 25 states and the District of Columbia. The 54 foreign investigators represent Australia, Belgium, Canada, Czechoslovakia, Finland, West Germany, Japan, Korea, Switzerland, United Kingdom, South Africa, Italy, France, Norway, India, and Spain.

A total of 1,620 separate samples, rocks, fines, chips, and thin sections will be distributed. The scientists will perform analysis in mineralogy-petrology, chemical-isotope, physical properties, and bioscience and organic investigations.

Preliminary examination at the Lunar Receiving Laboratory has revealed the Apollo 12 material has characteristics similar to the samples returned on Apollo 11. Mineralogically, the 12 samples contain the same major minerals, pyroxene, plagioclase, olivene, and ilmenite, as found in the samples returned by the 11 crew.

Most of the 12 rocks are a coarse grained crystalline variety with abundant pits and glass splashes throughout the material.

Potassium-Argon age dating, conducted during the preliminary examinations at the LRL shows the Apollo 12 samples to be about 1 billion years younger than the age of the Apollo 11 samples determined by the same method. Other tests revealed the 12 samples to have organic content of somewhat less than that found in 11 samples.

The principal investigators will be asked to make a report of their findings at a Lunar Science Conference scheduled to be held in Houston, Texas in January 1971.

Of the 28 pounds of material distributed to scientists, approximately four pounds will be destroyed in the course of the planned experiments. The remaining 23.7 pounds of sample material will be returned to NASA.

The parts of the Surveyor III spacecraft which were returned by the 12 crew were released from the LRL on January 10. Scientists and engineers at the Jet Propulsion Laboratory, Pasadena, California and Hughes Aircraft Company, Culver City, California are currently examining parts of the Surveyor TV camera, TV cable and scoop.

In addition to the Apollo 12 samples NASA will distribute an additional 112 grams of Apollo 11 material to 13 scientists in the U.S. and Japan for second generation experiments.

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483-5111

February 13, 1970 MSC 70-25

Houston

BE4

HOUSTON, TEXAS--Establishment of a Space Shuttle Program Office was announced today by the Manned Spacecraft Center.

Robert F. Thompson was named program manager. Kenneth S. Kleinknecht succeeds Thompson as Manager of the Apollo Applications Program Office. Clifford E. Charlesworth has been named Deputy Manager, AAP, a new position. Charlesworth has been a flight director in the Gemini and Apollo programs.

The appointments are effective immediately. No successor has been named to Kleinknecht's former position as Manager for Command and Service Modules, Apollo Spacecraft Program Office.

*The Space Shuttle Program Office will be responsible for managing the studies to be awarded and subsequent development of the reusable space shuttle craft.

The new office is still in the planning stage. Details such as size, composition, and further appointments within its management structure will be announced later.

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MANNED SPACECRAFT NASA

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February 17, 1970 MSC 70-27

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HOUSTON, TEXAS--Scientific instruments left on the Moon by the Apollo 12 crew are expected to record possible thermal "shock" effects on the lunar surface during a lunar eclipse on February 21, 1970.

The lunar eclipse, a twice a year event, is caused by the Earth blocking out the rays of the Sun. This turns lunar day into partial lunar night causing a thermal "shock," the effects of which will be measured and transmitted to Earth by the Apollo 12 Lunar Surface Experiment Package (ALSEP). The eclipse will start at 12:55 a.m. CST, Saturday, February 21, 1970.

Scientists at the NASA Manned Spacecraft Center anticipate the thermal "shock" to crack rocks, release entrapped gases, make the lunar surface tremble and modify the electric fields near the lunar surface. The Apollo Lunar Surface Experiment Package (ALSEP) will be in the shadow caused by the passage of the Earth between the Sun and the Moon.

The ALSEP gives man the first opportunity to study the results of such an eclipse on the lunar surface. The array of scientific instruments has been in continuous operation since its emplacement on the Moon by the Apollo 12 crew on November 20, 1969.

"We will possibly see the effect of the release of entrapped gases from the lunar surface," Dr. John Freeman, Associate Professor of Space Sciences, said of the eclipse. Dr. Freeman is principal investigator of the ALSEP's lunar ionosphere detector which is designed to study the charged particles in the lunar atmosphere.

Five instruments, a power source, and data system comprise the ALSEP which will study the eclipse and transmit the data to the Mission Control Center at MSC.

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The Passive Seismic Experiment (PSE) measures disturbances produced by the Moon quakes and Meteoroid impact. The PSE will record the cracking or seismic disturbances caused by the eclipse.

The Lunar Surface Magnetometer (LSM) will measure the magnitude and direction of the surface magnetic field effected by the eclipse.

The Lunar Ionosphere Detector and the Lunar Atmospheric Detector will record changes, if any, in the lunar ionosphere and atmosphere which may be caused by the eclipse.

Solar Wind Experiment will measure any changes in the solar wind which the eclipse may cause.

The eclipse, which occurs during lunar day, will cast a dark shadow (Umbra) over the Moon for approximately one hour and a lighter shadow (Penumbra), which only partly cuts off the sunlight, will last for approximately five hours. The temperature on the lunar surface is expected to drop from 250 degrees (centigrade) to a minus 200 degrees (centigrade).

AERONAUTICS AND SPACE ADMINISTRATION

MANNED SPACECRAFT

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483-5111

MSC 70-31 March 9, 1970

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HOUSTON, TEXAS -- The National Aeronautics and Space Administration has awarded a cost-plus-fixed fee contract to the General Electric Co. for Spacecraft Checkout (ACE-S/C), Reliability and Quality Assurance Engineering and Systems Engineering in support of NASA's Apollo and Skylab programs. This contract definitizes a letter contract with General Electric.

The period of performance for this work will be from October 1969, through December 1972. The value of the cost-plus-fixed-fee contract is \$57,264,989.

The contract provides for equipment and engineering required for the continued use of Acceptance Checkout Equipment - Spacecraft (ACE-S/C) stations, reliability and quality assurance engineering and other engineering efforts required by the Apollo and Skylab Program Offices of the NASA's Manned Spacecraft Center.

General Electric will be required to modify, program, maintain, and operate the ACE-S/C stations as required through December 1972.

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MANNED SPACECRAFT

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March 10, 1970

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Houston



483-5111

HOUSTON, TEXAS--An experimental, low-cost spacecraft module, the Subsystem Test Bed (STB), began a ten-day vacuum chamber test today, March 10, at the NASA Manned Spacecraft Center.

The test is being conducted in the 65-foot-diameter, 120-foot-high chamber A of MSC's Space Environment Test Division and will determine how the STB reacts to the temperature and vacuum extremes of space.

Engineers at MSC will compare thermal-vacuum results on the full-scale STB with results from similar tests on smaller scale models and with mathematical predictions. By correlating the results it would be possible to verify the thermal-vacuum design of future, large space vehicles using smaller and less expensive scale models in vacuum chamber tests.

The test is planned to last 257 hours and will subject the 15-foot-diameter, 9-foot-high STB to temperatures ranging from 100 degrees Fahrenheit below zero to 230 degrees above zero and to a vacuum equivalent to that almost 100 miles above Earth.

Solar simulators in the huge vacuum chamber will reproduce heating from the sun while chamber wall panels cooled to 300 degrees below zero Fahrenheit with liquid nitrogen will simulate the coldness of space.

For the current test the STB will have no interior subsystems except for a temperature and humidity control package which will circulate air inside the vehicle and control the air temperature. Two of the STB's six circular windows will have motorized shades which can be raised and lowered during the test.

In future tests the STB will provide a realistic spacecraft structure for development work on advanced space vehicle equipment such as environmental control systems for long-duration missions and on-board checkout systems for maintenance during flights.

The cake-lid shaped STB was designed and built by the Martin Marietta Corporation, Denver under a NASA supporting Development contract. The vehicle structure was delivered to MSC in April 1968, where it has since been equipped with hatches, windows, trusses, insulation, surface skin and other auxiliary equipment. The vehicle satisfactorily completed static launch load tests, docking and thrusting load tests and leakage and pressure tests before going into the current thermal-vacuum test series.

The STB test program is managed by MSC's Spacecraft Design Office with support from the Center's Space Environment Test, Structures and Mechanics, Crew Systems, Engineering, and Technical Services Divisions.

During the STB test Manned Spacecraft Center engineers will also be evaluating the performance of a novel device called a heat pipe, which may be useful in controlling the temperature of future space vehicles.

Up to now spacecraft designers have faced a difficult problem in maintaining the proper temperatures in spacecraft, which receive large heat inputs from the sun on one side and radiate heat rapidly into space on the other side. This condition can cause a number of problems including failure of electrical equipment in areas of high heating and freezing of propellant and fluid lines in areas of extreme cooling.

The Apollo spacecraft uses insulation, heaters and absorptive and reflective coatings to minimize adverse thermal effects. During flight the spacecraft is also rotated slowly to give more uniform surface temperatures.

Heat pipes transfer thermal energy efficiently and uniformly from one location to another and could conceivably do much to solve the tricky problem of thermal control in space vehicles. The device is basically a hollow tube containing a small amount of fluid. The fluid will absorb heat until it reaches vaporization temperature, a temperature determined by the type of fluid and the pressure inside the tube. The fluid vapor will then transfer heat uniformly through the tube to a point where it can either be radiated or made to do useful work.

Heat tubes can be formed into continuous loops and the loops stacked to form the structure of a space vehicle. By controlling the pressure or changing the fluid within the pipes, future astronauts could provide the proper temperatures for any given area of the vehicle with little or no concern about the vehicle's attitude toward the sun.

Two heat pipes are supported above the Subsystem Test Bed in Chamber A. The pipes are stainless steel, about one-half inch in diameter and are formed into a 15-foot-diameter loop. To assist with absorption and radiation of thermal energy four-inch longitudinal fins made of copper have been attached to each of the pipes. A stainless steel wick inside the pipes is used to collect condensed vapor and return it to the heat source by capillary action.

One of the pipes contains 300 cubic centimeters of water and is expected to reach an equilibrium temperature of about 76 degrees Fahrenheit. The second pipe contains 300 cubic centimeters of methanol and will be used as a comparison for the pipe containing water.

The heat pipes to be used in MSC tests are the largest of their type ever built. They were designed and fabricated by TRW Systems Group of Redondo Beach, California.

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MANNED SPACECRAFT



Houston 1. Texas

483-5111

April 8, 1970 MSC 70-39

HOUSTON, TEXAS --- The National Aeronautics and Space Administration Manned Spacecraft Center, has awarded a \$875 thousand contract to the Hycon Manufacturing Company, Monrovia, California for five lunar topographic camera systems.

The camera will be flown on the Apollo 13, 14, and 15 missions to photograph future lunar landing sites and targets of scientific interest. It will be equipped with an 18-inch-focal-length lens and will give sufficient resolution to identify objects as small as 8 to 15 feet in diameter in photographs taken from an altitude of 60 nautical miles. From an altitude of 50 thousand feet objects from three to five feet in diameter can be identified in the four-and-one-half inch square photographs taken by the camera.

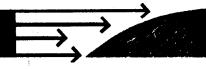
The lunar topographic camera will be mounted in the window of the crew access hatch. With an accompanying remote control panel, astronauts may operate it in an automatic mode for overlapping topographic coverage or in a manual mode. The camera will hold 200 feet of film and will take more than 400 stereographic or conventional pictures without reloading. To prevent image blur, it will automatically compensate for the relative motion of the spacecraft and the lunar surface by rocking back and forth on pivot mounts. It also has a vacuum platen that holds the film flat to minimize distortion, and it has a timing device which permits correlating each exposure with the spacecraft attitude at the time the picture was taken.

The camera is about 28 inches long, 11 inches wide, and 12 inches high, and weighs about 64 pounds with film.

Hycon builds the camera system, a modified version of an existing camera now in production, at its facility in Monrovia, near Los Angeles.

MANNED SPACECRAFT CENTER

NASA



Houston 1, Texas

483-5111

April 9, 1970 MSC 70-40 BE4

The National Aeronautics and Space Administration has awarded a \$4.5 million contract to the Fairchild Camera and Instrument Corporation, Syosset, New York for a camera system to be used on future Apollo missions for precision mapping of the moon.

Fairchild will design, develop, fabricate and test a 3-inch-focal-length mapping camera, a stellar reference camera and a timing device. NASA has a separate contract with the Radio Corporation of America for a laser altimeter, which Fairchild will integrate, along with other elements of the system, into a single package which can be operated remotely from the Apollo command module.

The heart of the system is the 3-inch mapping camera which will provide 4.5 inch X 4.5 inch photographs with the precise geometric controls necessary for accurate mapping. The 4.5 inch square photographs can be adapted for use in most mapping laboratories, which use 9 inch square format.

The stellar reference camera used in the system together with the laser altimeter and the timing device will give map makers the space-craft attitude, the time and the altitude at which each photograph was taken.

The Fairchild mapping system and a 24-inch-focal-length, high-resolution camera produced by the Itek Corporation of Lexington, Massachusetts, will be part of a scientific instrument package to be carried in the spacecraft service module as early as Apollo 16.

The Itek camera will provide high resolution panoramic photographs which can be correlated with the lower-resolution mapping photographs for detailed and systematic mapping of the moon's surface.

Film magazines from the cameras will be retrieved by one of the astronauts and returned to the command module before the two spacecraft modules separate for earth entry.

Under the cost-plus-fixed-fee contract, Fairchild will deliver three flight units and associated mockups, simulators, prototypes, qualification units and ground support equipment. NASA has the option of purchasing two additional flight units and associated ground support equipment at an additional cost of \$615 thousand.

Fairchild will produce the mapping camera systems at its facility in Syosset, Long Island, New York.

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Houston

483-5111

MSC 70-41

BE4

Houston, Texas --- The NASA Manned Spacecraft Center has awarded a \$1.9 million contract to Itek Corporation, Lexington, Massachusetts, for design, development, and delivery of multispectral photographic equipment for use in Project Skylab.

The contract calls for the delivery of a six lens camera unit which will be flown as part of the Earth Resources Experiment Package. The multispectral camera is part of an integral group of experiments that will provide data on surface reflectance emmitance and texture along with determining the effects of atmospheric influences over a broad portion of the electromagnetic spectrum.

Itek will provide one flight and one backup unit along with associated lenses and magazines. The multispectral unit will utilize six high precision 70mm cameras with matched distortion and focal length. The lenses will have a focal length of six inches (21.2 degree field of view) providing approximately 80 nautical miles square surface coverage from the 235 mile orbital altitude.

Itek is scheduled to deliver the flight hardware by July 1971.

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AND SPACE ADMINISTRATION

MANNED SPACECRAFT Houston

483-5111

MSC 70-42 April 22, 1970

HOUSTON, TEXAS -- Dr. Charles A. Berry, Director of Medical Research and Operations at the NASA Manned Spacecraft Center will preside as president of the 41st annual scientific meeting of the Aerospace Medical Association (ASMA) April 27-30 in St. Louis, Mo.

Twenty-three members of the MSC's medical directorate are scheduled to take part in the scientific meeting which will be headquartered at the Chase-Park Plaza Hotel, St. Louis. Members of the directorate will deliver technical and medical papers as well as take part in a panel discussion on a "Report on Apollo Lunar Missions" scheduled for 2:00 p.m. on April 30.

Dr. Berry announced Wednesday that William A. Anders, Executive Secretary of the National Aeronautics and Space Council, will deliver the annual Louis H. Bauer Lecture on the opening day, Monday, April 27. Anders, former lunar module pilot on Apollo 8, the first manned orbital flight in December 1968, will speak on "Aeronautics and Astronautics Prospects for the 70's."

Dr. Berry is the 39th President of the ASMA which is composed of professionals in the field of aerospace medicine in government and private industry. Dr. Berry has been Director of Medical Research at MSC since 1966.

Add 1 MSC 70-42

MSC doctors scheduled to present papers are: C. L. Fischer,

"Laboratory Medicine in Support of Project Apollo;" Carolyn Leach

Huntoon, "The Urinary Excretion of Aldosterone;" G. F. Humbert,

"Metabolic Assessment of the First Lunar Walk;" P. C. Rambaut, "The

Nutritional Dilemma of Apollo Applications;" and W. C. Alexander,

"Intrinsic Control of Fluid Transport in Canine Skeletal Muscle."

Scheduled to take part in the Apollo panel during the Thursday session are: Drs. Fischer, W. W. Kemmerer, J. A. Rummel, and R. L. Johnson.

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NATIONAL AERONAUTICS AND SPACE ADMINISTRATION
MANNED SPACECRAFT
NASA

CENTER NASA

1. Texas

483-5111

70-42a April 22, 1970

Houston, Texas---Earth resources data of selected areas of Texas gathered by the NASA's Manned Spacecraft Center will be presented Thursday to representatives of the Texas Committee for the Study of Land Use and Environmental Control.

The 20-member state committee, headed by Senator Criss Cole of Houston, will be briefed on the operation of MSC's earth resources aircraft program. The committee also will receive a detailed presentation of earth resources data on Texas collected while developing remote sensing techniques for spacecraft applications.

Representatives of the Earth Resources Division of MSC's Science and Applications Directorate will explain and display photographic and other imagery data collected of selected areas of Houston-Galveston, Dallas-Ft. Worth, El Paso, the Gulf Coast and numerous inland areas of Texas. The briefings are scheduled to start at 1:30 pm Thursday in Bldg. 2 at MSC.

NATIONAL AERONAUTICS AND SPACE ADMINISTRATION
MANNED SPACECRAFT
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HOUSTON
1. Texas

483-5111

70-43 April 23, 1970

Houston, Texas---The National Aeronautics and Space Administration has awarded the Garrett Corp., Airesearch Manufacturing Company Division, Los Angeles, Calif., a \$3,000,000 contract for a portable astronaut life support assembly (ALSA). The ALSA is for use in support of extravehicular and intravehicular activity for the Skylab program scheduled for flight in 1972.

The astronaut life support assembly consists of two items: a pressure control unit for ventilation and pressurization to a suited astronaut receiving oxygen from the spacecraft oxygen system via an umbilical; and an emergency oxygen pack, separately packaged from the pressure control unit. The emergency oxygen pack will automatically provide oxygen to the pressure control unit in the event that the umbilical supply becomes insufficient.

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NATIONAL AERONAUTICS AND SPACE ADMINISTRATION

MANNED SPACECRAFT NASA Houston CENTER NASA 1. Texas

483-5111

70-44 April 24, 1970

The National Aeronautics and Space Administration has selected Wackenhut Services, Inc. of Coral Gables, Fla., for final negotiation of a contract to provide security, safety, fire protection, and emergency ambulance services to the Manned Spacecraft Center, Houston.

The estimated value of the 1-year cost-plus-award-fee contract is \$1.2 million. Services are to be provided from July 1, 1970 through June 30, 1971, with contractual provisions for two additional 1-year extensions.

Wackenhut Services, which has provided security and fire protection services at the Manned Spacecraft Center for the past 3 years, was selected by NASA from among five firms responding to an MSC request for proposals.

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NATIONAL AERONAUTICS AND SPACE ADMINISTRATION MANNED SPACECRAFT NASA Legis 28, 1970 April 28, 1970 BE 4

The National Aeronautics and Space Administration's Manned Spacecraft Center has issued a cost plus fixed fee contract to The Boeing Company, Southeast Division, to define a letter contract for systems engineering and flight readiness assessment in support of NASA's Apollo Program.

The period of performance is from January 1, 1970 through December 31, 1970, with options for calendar years 1971 and 1972. The estimated value of the contract, including options, is \$34,065,390.

The majority of the work will be performed by The Boeing Company at their facility in Houston, Texas.

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RELEASED BY NASA HEADQUARTERS

The Fra Mauro region of the Moon has been selected as the landing site for the Apollo 14 mission.

The choice was made by Dr. Thomas O. Paine, NASA Administrator, following the recommendation of the Apollo Program site selection committee meeting today at the Manned Spacecraft Center.

Fra Mauro was the intended landing site of last month's unsuccessful Apollo 13 mission.

Dr. Paine said information so far developed by the Apollo 13 Review Board indicates that Apollo 14 cannot be launched before Dec. 3.

"Our present assessment is that the modifications to the oxygen tanks in the Service Module that have already been identified will require several months and that Apollo 14 cannot be launched before the Dec. 3 launch window," said Dr. Paine.

"We will take whatever time is necessary and will not commit to a specific launch date until the Apollo 13 Review Board completes its work and makes its findings and recommendations," he added.

The flight crew for Apollo 14 will be Capt. Alan B. Shepard USN, Commander; Maj. Stuart A. Roosa, USAF, Command Module Pilot; and Cdr. Edgar D. Mitchell, USN, Junar Module Pilot.

The landing site is in the hilly uplands north of the crater Fra Mauro. The lunar coordinates are 3.6 degrees south latitude by 17.5

Hqs. release on Apollo 14 landing site Add 1

degrees west longitude, about 110 miles east of where Apollo 12 landed last November. New trajectories for Fra Mauro landings will be calculated for Dec. 3, 1970, and subsequent opportunities in early 1971.

Fra Mauro is of great interest to scientists because it is expected to provide new information on the age of the Moon.

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NATIONAL AERONAUTICS AND SPACE ADMINISTRATION MANNED SPACECRAFT HOUSTON

483-5111

May 12, 1970

RELEASED BY NASA HEADQUARTERS

The National Aeronautics and Space Administration selected two aerospace industrial firms today for final negotiations of parallel 11-month contracts for definition and preliminary design studies of a reusable space shuttle vehicle for possible future space flight missions.

Fixed priced contracts will be negotiated with McDonnell-Douglas Corp., St. Louis, and North American Rockwell Corp., Space Division, Downey, Calif. valued at approximately \$8 million each.

NASA's Marshall Space Flight Center, Huntsville, Ala., will manage the McDonnell-Douglas work; the North American Rockwell contract will be managed by the NASA Manned Spacecraft Center, Houston. Four firms submitted proposals for the studies.

The two-stage, space shuttle vehicle will transport crew, passengers and cargo from Earth to near space and back. It will be used for logistics missions such as the delivery of propellants and supplies to a space station or another orbiting vehicle; for the delivery of propulsive stages and payloads and for the placement, maintenance and retrieval of experimental modules and satellites. It may also be used for short duration special purpose space flight missions, including rescue operations.

The space shuttle will reduce significantly space operational costs through vehicle reuse and payload simplification; provide a commercial airline type environment for crew and passengers; provide a high launch rate capacity; and extend the technology of space transportation systems including a land landing capability. The vertical take-off, horizontal-landing shuttle could be in operation by 1977 or 1978.

Principal subcontractors proposed by McDonnell-Douglas are Martin Marietta Corp., Denver; TRW Inc., Los Angeles; Pan American World Airways Inc., Cocoa Beach. Fla.; Raytheon Co., Lexington, Mass.; Sperry Rand Corp., Great Neck, N. Y.; and Norden Division of United Aircraft, Norwalk, Conn.

Subcontractors proposed by North American Rockwell are General Dynamics Corp., San Diego; International Business Machines Corp., Huntsville, Ala.; Honeywell, Inc., Minneapolis; and American Airlines, Inc., New York, N.Y.

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MANNED SPACECRAFT NASA HOUSTON

CENTER 1, Texas

483-5111

70-48 May 13, 1970 BE4

HOUSTON, TEXAS---The NASA Manned Spacecraft Center has selected the Lockheed Missiles and Space Company, Sunnyvale, California, for award of a contract for a large space station solar array technology evaluation program.

The cost-plus-fixed-fee contract is approximately \$1,075,000.

The objectives of the program are to conduct a technical evaluation of the current state-of-the-art of solar systems. Design analysis and test evaluation of components in three areas also is called for in the contract.

The three areas include: array structure; deployment and orientation; and power transfer procedures.

The work will be conducted under the direction of the MSC Propulsion and Power Division, and it is to be completed in 18 months.

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MANNED SPACECRAFT CENTER

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Houston 1, Texas

483-5111

May 15, 1970 BE

HOUSTON, TEXAS---The National Aeronautics and Space Administration, Manned Spacecraft Center has invited eight firms to submit proposals for development of a prototype lighweight, intravehicular space suit assembly for advanced space missions.

The suit is to weigh approximately 10-12 pounds and is to be comfortable enough to be worn full-time during space flights. It is believed that a lightweight suit can be developed which will not restrict astronaut movement when unpressurized and which can be worn as the primary garment in a shirt-sleeve environment.

The suit will be configured with a soft collapsible helmet which can be installed quickly if the suit needed to be pressurized in an emergency.

It is expected that a three phase contract will be awarded for design and development of two prototype suits. Design and development of a first prototype is to be completed nine months from award of a contract. Any necessary modifications to the prototype will then be made and a final version prototype will be delivered 16 months from the award of a contract.

Production of flight qualified suits would be handled under a separate contract.

The suit is to be durable enough to withstand pre-flight training and testing and missions lasting up to one year with daily donning and doffing. And it is to be designed so a crewman can put it on without assistance, hook up to the spacecraft environmental control system and pressurize the suit within two minutes.

Industry proposals are to be submitted to the Manned Spacecraft Center by May 27. It is expected that a single contract will be awarded for prototype design and development.

NATIONAL AERONAUTICS AND SPACE ADMINISTRATION MANNED SPACECRAFT LEENTER Hold For Release Until May 24, 1970

HOUSTON, TEXAS-A new dimension in information gathering for the 1970 census is being conducted from an altitude of 10 miles with the aid of aircraft from the NASA Manned Spacecraft Center, Houston, Texas.

NASA is flying a four engine RB77 jet over selected U. S. cities gathering photographic data for census correlation studies for the U.S. Geological Survey. In recent weeks, the RB577 - part of the MASA Earth Resources Survey Program operated by the Manned Spacecraft Center's Science and Applications Directorate + has conducted aerial photographic surveys of Asheville, N. C., Atlanta, Ga., New Orleans, La., and three Texas cities - Dallas, Houston, and Wichita Falls. Susan Moorlag, Robert Alexander and James R. Wray of the USGS are co-investigators for the census flights.

Other cities which will be photographed during the next several weeks are: Aurora, Illinois; Boston, Massachusetts; Cedar Rapids, Iowa; Denver, Colorado; El Paso, Texas; Lawrence, Kansas; Midland, Texas; New Haven, Connecticut; Peoria, Illinois; Phoenix, Arizona; Pontiac, Michigan; Riverside, California; Salt Lake City, Utah; San Francisco, California; San Juan, Puerto Rico; Seattle, Washington; Tampa, Florida; Tucson, Arizona; Washington, D. C.; and West Palm Beach, Florida.

The RB57F is one of the three aircraft used in the aircraft survey program. The three aircraft - the 57F, C-130B and NP3A Lockheed Electra - fly multi-disciplined earth resource study missions

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for the development of remote sensing techniques from aircraft and spacecraft for numerous government agencies and universities. The project is conducted in cooperation with the Departments of Agriculture, Interior and Navy.

The major objective of the overall program is to derive benefits from the utilization of both aeronautical and space activities in the various earth sciences - geography, geology, hydrology, oceanography, agriculture and forestry.

A total of 26 cities will be overflown for the Geographic Applications Program, USGS. Purposes of the census flights, which are being flown at approximately the same altitude and at the same time of the day, is to gather standardized data on urban areas and correlating land usage with data gathered during the census.

Wray of USGS, who describes the aircraft census flights as "census contemporaneous" said "We plan to relate data gathered from these flights with statistical data to determine to what extend we can detect urban changes from the air or space."

The census flight experiment will provide interurban comparisons of area, functional and environmental characteristics of selected cities, Wray said. This information will be used in evaluating the real time television imagery which will be transmitted from the earth resources technology satellite (ERTS) which is now scheduled to be launched during 1972-73.

The photography taken from the RR57F will be used to prepare a mosaic and orthophoto reference base of each urban area. It is planned that approximately 10 land use categories will be identified, mapped, and correlated with a universal grid system applied to each urban area.

Wray explained that "such uniformed assessments of land use and potential land use, in terms of airborn data keyed to census data, have not been heretofore possible."

Nine separate cameras, utilizing six different types of film are being used for this project. The camera array is mounted in the 4,000 lb. remote sensing pallet beneath the aircraft.

The census flights which are operated by the Aircraft Project Office of MSC's Earth Orbital Mission Office, are flown at about 50,000 feet above each city in order to produce as nearly as possible to the base of 1:1,000,000 scale.

The RB57F is a two man aircraft -- the pilot and the scientific instrument engineer. The engineer is a member of the Aircraft Project Office and the pilot is a USAF pilot.

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NATIONAL AERONAUTICS AND SPACE ADMINISTRATION MANNED SPACECRAFT LENTER May 21, 1970 MSC 70-56 MSC 70-56 MSC 70-56

HOUSTON, TEXAS--The National Aeronautics and Space Administration has awarded a \$1 million contract to TRW, Inc., Redondo Beach, California for initial design of a subsatellite to be placed in lunar orbit on the Apollo 16 and 18 missions:

The 80 pound subsatellite will be carried in a compartment of the Apollo service module as part of a scientific package which will include mapping and panoramic cameras, a laser altimeter and various remote sensors.

The subsatellite is a six-sided prism, 30 inches high and 14 inches in diameter that is spin stabilized at 12 revolutions per minute. Its payload consists of six charged particle detectors, a magnetometer and an S-band communications system. Electrical power is supplied by a battery/solar cell subsystem.

An astronaut will activate and deploy the subsatellite in a 60 nautical mile lunar orbit by operating a switch on the control panel of the command module which positions, spins and spring-ejects the subsatellite from its launching platform in the scientific instrument module of the CSM. The magnetometer experiment is extended on a boom which deploys after separation. Two other booms deploy for stabilization.

The subsatellite will be designed to operate in lunar orbit for about 1 year, providing information on charged particles and Earth's magnetic field in the vicinity of the Moon. By tracking the device

Add 1 MSC 70-56

scientists will also learn more about the nature of the lunar gravity field and the long-term effects of lunar gravity on an orbiting body.

Total cost of the subsatellite program is expected to be about \$5 million.

TRW, Inc., Systems Group will be required to design, develop, fabricate, assemble and test three flight subsatellites and launch platforms. Two of the systems will be used for flight and one will be used for qualification testing.

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NATIONAL AERONAUTICS AND SPACE ADMINISTRATION MANNED SPACECRAFT CENTER 483-5111 MSC 70-58 AC. J.

HOUSTON, TEXAS--A NASA scientist today reported a microorganism thought to have been accidently deposited in the Surveyor III TV camera prior to its launch to the Moon three years ago, was recovered from inside the camera when it was returned to Earth by the Apollo 12 crew in November 1969.

Frederick J. Mitchell, a microbiologist in NASA's Lunar Receiving Laboratory at the Manned Spacecraft Center, Houston, Texas said the microorganism - Streptococcus mitis - apparently survived the launch, the three-day Moon-bound journey in the vacuum of space, and 950 days in the hostile lunar environment. The organism was found following extensive laboratory testing of the camera parts in Houston.

Mitchell, a USAF Captain on assignment to the Medical Research and Operations Directorate at MSC, is project officer for the team of microbiologists who took part in the nearly five-month study of the retrieved camera and a Surveyor III backup camera. Others in the group are: Walter L. Ellis, Microbiology Laboratory Supervisor for Brown and Root/Northrup (NASA LRL support contractor) and Dr. Martin D. Knittel of the Jet Propulsion Laboratory.

Streptococcus mitis is a common respiratory organism. This organism does not ordinarily produce disease in man and the retrieved organism produced no disease on animal innoculation.

Add 1 MSC 70-58

Microbial analysis of the retrieved Surveyor parts began in the LRL early this year following the release from quarantine of the Apollo 12 crew. Mitchell revealed details of the five month study following completion of testing on the retrieved camera and backup Surveyor III camera.

Mitchell said the microorganism was found in a small bit of polyurethane foam which was used as insulation in circuit boards inside the camera housing. The small bit of foam (one cubic millimeter in size) was placed in Thioglycollate broth, a bacterial media solution, at 37 degrees centigrade.

"The first signs of life were observed after four days of incubation (in the bacterial media). On the next day (the fifth day of incubation) the tube was turbid with growth," Mitchell reported.

"The accumulation of data concerning its growth in association with the foam sample, the location where it was isolated, the initial delay in growth, and other laboratory data leads us to conclude that the best explanation of the data is that it is a 'surviving organism' deposited prior to launch and not on its return trip to Earth,"

Mitchell said.

Samples of the microorganism were sent to U. S. Communicable

Disease Center, Atlanta, Ga., which confirmed it to be <u>Streptococcus</u>

mitis.

Add 2 MSC 70-58

Similar tests were conducted on a Surveyor III backup TV camera which had been retained in 'bonded' storage at Hughes Aircraft,

Pasadena, California since the April 17, 1967 launch. Test samplings were made and Captain Mitchell reported the Streptococcus mitis was not found in the backup camera.

Mitchell said the samples were taken by the same individuals and the procedures were identical to the retrieved camera. The samples were obtained from the backup camera at the Hughes plant in California and detailed analysis was performed on these samples at the LRL in Houston.

Both cameras - the retrieved camera and the backup camera - went through a series of "thermal vacuum tests" prior to the launch of Surveyor III. These tests were performed in a vacuum with hot and cold cycles.

In instances where repairs were needed the shroud on the camera was removed, the repair made, the shroud replaced and the camera was then subjected to another thermal vacuum test.

Mitchell said the microorganism was probably accidently deposited on the camera during one of the times the camera shroud was removed for repairs.

These procedures and the high vacuum of space are thought to have been responsible for the preservation of this organism in a lyophilized state (freeze-dried). Investigators had predicted it might be possible for organisms to survive under such circumstances.

NATIONAL AERONAUTICS AND SPACE ADMINISTRATION
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483-5111

MSC 70-63 June 4, 1970 BEU

HOUSTON, TEXAS--The National Aeronautics and Space Administration Manned Spacecraft Center, Houston, has awarded a \$13 million contract extension to ILC Industries, Dover, Delaware for additional Apollo space suits and associated support through 1971. This brings total value of the contract to \$46,543,299.

Under terms of the contract ILC Industries will supply 36 additional A7L Apollo pressure garment assemblies and will provide associated field support at the Manned Spacecraft Center and the Kennedy Space Center, Fla.

ILC Industries fabricates the Apollo pressure suit at its facility in Dover.

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TIONAL AERONAUTICS AND SPACE ADMINISTRATION NNED SPACECRAFT June 17, 1970 MSC 70-68 483-5111

HOUSTON, TEXAS -- The National Aeronautics and Space Administration has awarded a \$100 thousand fixed-fee contract to the Grumman Aircraft Engineering Corporation, Bethpage, New York to study station operating techniques during a space station mission.

Purpose of the study, according to the work statement, is to "define crew command structure necessary to insure . . . successful operations in pursuit of defined mission objectives."

Included in the study will be a definition of crew duties, training requirements, duty and rotation cycles, and the kind, number and type of crew member that will comprise the station complement.

The contract will be administered by the Advance Missions Program Office at the Manned Spacecraft Center, Bouston, Texas.

It is to be completed in February 1971.

483-5111

June 18, 1970 MSC 70-69

HOUSTON, TEXAS--Three hundred scientific proposals detailing analysis of lunar samples returned on future Apollo missions are currently being reviewed by the National Aeronautics and Space Administration.

The proposals were submitted by scientists from the U.S. and 25 foreign countries. The NASA in March 1970 invited the international scientific community to propose studies of Moon rocks and soil expected to be recovered by Apollo missions 14 through 19.

The research proposals are being evaluated on the basis of scientific merit. The investigators proved ability, the readiness of his laboratory to conduct the proposed studies and the amount of lunar material and NASA funds required.

Scientists at the Manned Spacecraft Center are reviewing the research proposals. The review process is being coordinated at MSC by the Lunar Sample Office of the Science and Applications Directorate. John W. Harris is manager of the Lunar Sample Office.

One hundred and fifty of the 192 scientists currently analyzing Apollo 12 lunar material have submitted proposals to conduct studies on samples from Apollo missions 14 through 19.

Seventy-four of the 300 proposals are from scientists representing Austrailia, Austria, Belgium, Brazil, Canada, Ceylon, Czechoslavakia, England, Finland, France, Germany, Greece, the Netherlands, Italy, Japan, Korea, Norway, Scotland, South Africa, Spain, Sweden, Switzerland and West Pakistan.

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NATIONAL AERONAUTICS AND SPACE ADMINISTRATION

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June 24, 1970 MSC 70-72

HOUSTON, TEXAS--Members of U. S. military services assigned to the Manned Spacecraft Center will be honored in an awards ceremony at MSC Friday, June 26.

Eighty awards will be presented including the Silver Star, the Legion of Merit, the Meritorious Service Medal, the Air Medal, the Air Force Commendation Medal, the Republic of Viet Nam Service Medal, and the Purple Heart.

Award presentations will be made by Astronauts Edwin E. Aldrin, Jr., and Thomas P. Stafford. Speakers at the ceremony will be MSC Director Robert R. Gilruth, Donald K. Slayton, Director of Flight Crew Operations, Flight Director Milton L. Windler, and Colonel William C. Moore, Headquarters Command, USAF.

The awards ceremony will be held in the MSC auditorium, Building 1 at 3:00 p.m. Friday, June 26.

Major William W. Fink, Jr., will receive the Silver Star for gallantry in military action in Southeast Asia. Major Fink was cited for disregarding his own personal safety while conducting a highly successful night bomber attack against heavily fortified enemy gun positions on November 29, 1967.

Major Fink is presently assigned to the Flight Control Division at MSC.

Major Fink's father, William W. Fink, Sr., will be awarded the Purple Heart at the same ceremony. Mr. Fink, who lives in Houston, earned the Distinguished Service Cross and the Purple Heart as a private during World War I in action at Remonville, France. He received the Distinguished Service Cross, but was never presented the Purple Heart.

Major Lloyd Reeder, Mr. Quentin A. Holmes (formerly Captain), Major George M. Colton and Dr. Malcolm A. Smith (formerly Major) will be awarded the Legion of Merit for "significant contributions to the effectiveness and successful accomplishment of the national goal of placing a man on the Moon and returning him safely."

Major Reeder is assigned to MSC's Flight Crew Support Division and served as training coordinator for the Apollo 11 astronauts. Mr. Holmes is assigned to the Center's Mission Planning and Analysis Division where he developed improved techniques for computing lunar trajectories. Dr. Smith is assigned to the Medical Research and Operations Directorate and headed the team which developed and qualified food processing and packaging techniques for Apollo missions. Major Colton is assigned to the Flight Crew Support Division and was in charge of preparing maps, charts and other graphic aids needed by the Apollo 11 astronauts in navigating to and from the Moon and in conducting lunar surface operations.

The Meritorious Service Medal will be presented to the following 31 persons for outstanding contributions to the Apollo and Manned Orbiting Laboratory programs: Colonel Charles M. Barnes, Lt. Colonel William J. Frome, Major Richard A. Boster, Lt. Commander Robert R. Crippen (USN), Major Charles G. Fullerton, Major William R. Marlowe, Jr., Major Joe H. Roberts, Major Charles J. Tringali, Captain William H. Block, Captain Bernard A. Durand, Captain Grover D. Fulkerson, Captain Fred C. Jensen, Captain Joseph A. Lazzaro, Captain Edwin F. Marzano, Captain Rodney J. Reining, First Lt. Nathan J. Adams, Jr., Lt. Colonel Albert H. Crews, Jr., Lt. Colonel Turnage R. Lindsey, Major William D. Dupee, Major Charles T. Essmeier, Lt. Commander Richard H. Truly (USN), Major Robert F. Overmeyer (USMC), Major John E. Streit, Major William H. Wood, Jr., Captain Charles A. Denham, Captain Robert M. Edwards, Captain Michael J. Howley, Captain Richard J. Labrecque, Captain Joe M. Leeper, Captain Dwight G. Peterson, Captain Harold O. Spurlin.

Major Gail F. Steele will receive the Air Medal, Sixth Oak Leaf Cluster and Captain Laverne B. Tubergen will receive the Air Medal, First Oak Leaf Cluster for "meritorious achievement" while participating in aerial missions in Southeast Asia.

The Air Force Commendation Medal will go to the following individuals: Major Vernon L. Carter, James D. Duval, Jr., LCol., USAF (Ret), Captain Vito J. Pagano, Captain Richard A. Willhite, Major Alfred H. Davidson III,

Captain Marion D. Clark, Captain Cletus B. Kuhla, William C. Loveless, LCol., USAF (Ret), Captain Francis J. Welsh, Major Thomas L. Stuebe, Captain Robert M. Bond, Captain Ross E. Ferland, Captain James F. Gilbert, Captain Howard C. Johnson, Jr., Captain Paul H. Kruppenbacher, Captain Thomas A. Runner, Captain Ronald E. Sickler, Captain Raymond F. Teague, Captain William G. Weppner, First Lieutenant John M. Hill, First Lieutenant George L. Stanton, Captain Jack D. Chandler, Jr., Captain John P. Oss, MSgt. James O. Schlosser, MSgt. Glenn R. Lowry, Major Gail F. Steele, Dennis H. Johnson, LCol., USAF (Ret), Captain Keith N. Kuhlenschmidt, Captain Terry L. Spencer, Major William W. Fink, Jr., Captain Peter K. Birk, Captain William P. Dotson, Jr., Captain Daniel K. Ford, Captain Thomas J. Hankee, Captain Lawrence W. Knutson, Captain George H. Raroha, Captain Samuel L. Ruple, Captain Paul G. Stokholm, Captain Charles R. Wells III, Captain James W. Williams, First Lieutenant Jose L. Saenz.

Lieutenant Colonel Turnage R. Lindsey will be awarded the Republic of Viet Nam Service Medal.

HOUSTON, TEXAS--The National Aeronautics and Space Administration has signed a supplemental agreement with North American Rockwell Corporation valued at \$4,785,130 for changes in the Apollo command and service module contract.

The agreement formally incorporates into the North American contract 26 changes previously authorized by NASA for modification to the contractor's ground support equipment, for test and checkout of the CSM, for modification to flight and ground test hardware, and for additional test and effect analysis changes.

The modifications bring the total estimated value of the North American contract since August 1963 to approximately \$3.5 billion.

North American Rockwell Corporation performs the majority of work on the command and service module contract at its Downey, California facility with support from divisions located in Anaheim, California and Tulsa, Oklahoma. Many subcontractor organizations also participate. In addition, launch support operations will be performed at the Kennedy Space Center, Florida, and related test activities will be carried out at the Manned Spacecraft Center, Houston, Texas.

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NATIONAL AERONAUTICS AND SPACE ADMINISTRATION

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MSC 70-74

HOUSTON, TEXAS--The National Aeronautics and Space Administration has awarded a \$20,000 contract to Texas Tech University to develop a new type electrode which may be used to monitor heart function of astronauts on Skylab missions.

July 1, 1970

The first Skylab flight -- a 28-day, earth orbital mission -- is scheduled for late 1972. One of the objectives of Skylab missions will be to evaluate the effects of long duration space flights on the physical condition of astronauts.

Electrocardiogram electrodes now available must be attached to the astronaut's body with a wet electrolyte paste. A dry, insulated electrode would be more easily removed and reattached in flight. It would also be more comfortable.

The primary problem in the fabrication of an insulated electrode is the deposition of an extremely thin, tough dielectric which can withstand normal handling and abrasion.

Work on the new electrode will be conducted at Texas Tech University in Lubbock under a one-year cost-reimbursement-type contract. Texas Tech is to deliver 25 completed ECG electrodes to the NASA Manned Spacecraft Center, Houston for evaluation and possible use on Skylab and other future programs.

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NATIONAL AERONAUTICS AND SPACE ADMINISTRATION
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MSC 70-75 July 1, 1970

HOUSTON, TEXAS--The National Aeronautics and Space Administration has signed a Supplemental Agreement with the Grumman Aerospace Corporation, Bethpage, N. Y., valued at about \$3,248,000, for changes in the Apollo Lunar Module contract.

The agreement formally incorporates into the Grumman contract 18 changes previously authorized by NASA for modification to the contractor's procedures of conducting vehicle readiness reviews, vibrational testing, changes to the rendezvous radar, Quality Assurance and Reliability Procedures, and for updating a descent engine.

The modifications bring the total estimated value of the Grumman contract since January 1963 to approximately \$1,673,119,200.

Grumman performs the majority of work on the Lunar Module contract at its Bethpage, N. Y., facility with support from its field offices in Houston, White Sands, and at the Kennedy Space Center, Fla. NATIONAL AERONAUTICS AND SPACE ADMINISTRATION
MANNED SPACECRAFT NASA

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483-5111

MSC 70-76 July 1, 1970

HOUSTON, TEXAS--The National Aeronautics and Space Administration today awarded a 10-month contract extension to Federal Electric Corp., Houston, for support services at the Manned Spacecraft Center, Houston. The cost-plus-award-fee extension has an estimated value of \$3.29 million. Total value of the contract is \$7.394 million since June 1, 1969.

Under the contract, Federal Electric will be responsible for realtime mission support, flight control documentation, technical editing and writing, engineering documentation, library materials processing, graphic illustrations, satellite quick-copy operation, microform services, publications and forms distribution, supply function, and moving and hauling services for the Manned Spacecraft Center.

The contract provides direct and indirect support to all administrative operations and research and development programs at the center for a 10-month period beginning June 1, 1970 and ending March 31, 1971.

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NATIONAL AERONAUTICS AND SPACE ADMINISTRATION

NATIONAL AERONAUTICS AND SPACE ADMINISTRATION

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483-5111

July 1, 1970

The NASA Manned Spacecraft Center has been informed that a fragment of Apollo 11 lunar material, weighing less than an ounce, is missing from the laboratories at the Goddard Space Flight Center.

The sample was reported missing by Dr. Nicholas M. Short of GSFC, one of the scientists assigned lunar material from Apollo 11. The sample was among several circulated within a group of scientists studying the effect of shock waves in lunar material.

Dr. Short reported to MSC that he inventoried his lunar samples last week and it was then that he found this particular sample missing. Dr. Short was preparing to return the samples to the sample curator at MSC. He last inventoried this particular sample late in February, MSC officials report.

The missing sample, about one-fourth inch in length and weighing .02 ounce, was part of a one pound fine grained gray rock (sample 10020) returned by the Apollo 11 crew. It was subsequently sub-divided and this fragment was examined by other scientists, before Dr. Short received it.

NASA officials are conducting an investigation into the circumstances surrounding the missing sample.

This is the second lunar specimen reported missing by a scientist. Late in January a University of California at Los Angeles scientist reported one of his sample specimens missing during a public display. It was subsequently returned to NASA.

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July 2, 1970 MSC 70-78 BEA

483-5111

HOUSTON, TEXAS--The NASA Manned Spacecraft Center has awarded a contract to UNIVAC Division of Sperry Rand Corp., St. Paul, Minn., for lease and maintenance of four UNIVAC 1108 computer systems.

The fixed-price supply contract for an initial three-month period April 1 through June 30, 1970 is valued at \$600,000. The agreement contains options for two additional one-year renewals, which could bring the total value to \$5,283,345.

The computers, located in Building 12 at MSC, are used for management and administrative tasks, analysis of test data, mission support and trajectory analysis, and scientific problem solving. Since 1966 the computers have been in use at the Center under a General Services Administration contractual agreement with Sperry Rand.

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MANNED SPACECRAFT NASA HOUSTON

483-5111

July 10, 1970 MSC 70-79

HOUSTON, TEXAS -- "Tranquility Base here. The Eagle has landed. . ."
A year has passed since those calm words from Neil Armstrong told
the waiting world that man had landed on another celestial body. The

Eagle touched down a year ago Monday, July 20.

MSC will observe the first anniversary of the Apollo 11 lunar landing by holding an extensive public open-house program Saturday, Sunday and Monday, July 18, 19, and 20. Saturday hours will be from 9:00 a.m. to 5:00 p.m., Sunday 1:00 p.m. to 5:00 p.m. and Monday 10:00 a.m. to 4:00 p.m.

Facilities at MSC open to visitors will include the auditorium and exhibit hall, the Mission Simulation and Training Facility, the Life Systems Laboratory, Central Data Office, Anechoic Chamber, Centrifuge, Mission Control Center, Space Environment Simulation Laboratory, Lunar Receiving Laboratory and cafeteria.

Equipment and space hardware flown on Apollo 11 will be on display in the auditorium lobby and the film "Returns from Space" will be shown at intervals in the auditorium. The Apollo 11 command module, "Columbia", is on a tour of all 50 state capitals and will not be available for the open house.

The Lunar Science Institute, located east of MSC on NASA Road 1, will also be open to the public Sunday and Monday from 3:00 p.m. to 5:00 p.m.

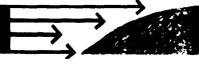
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NATIONAL AERONAUTICS AND SPACE ADMINISTRATION

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July 15, 1970 MSC 70-80

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HOUSTON, TEXAS--The government of Peru has accepted NASA's offer to send one of its remote sensing aircraft to help assess damage resulting from the recent severe Peruvian earthquake.

The aircraft, stationed at the Manned Spacecraft Center, Houston, Texas departed July 11. It stopped in Mexico City to pick up two representatives of the Mexican Space Commission's earth resources team and arrived in Lima July 12.

The aircraft, a Lockheed Electra equipped to acquire the black and white, color, and color infra-red photography and thermal infra-red imagery will be used to obtain data over the area in northern Peru which suffered the most severe earthquake damage.

Data acquired during the mission, which supplements that data already obtained by the Peruvian government, will be processed at the Manned Space-craft Center and furnished as rapidly as possible to Peruvian government authorities for analysis.

The duration of the mission will be from a week to a month, depending upon cloud cover conditions. It is expected that the data obtained, in addition to helping the Peruvian government assess damage and plan reconstruction, will also contribute to the future application of the science of remote sensing to natural disasters.

Approximately 30 different flights are scheduled during the next several weeks, along the western coast of Peru as well as the Santa Valley which experienced the heaviest damage. The NP3A Lockheed aircraft is being flown by members of the MSC Aircraft Operations Project Office (APO). APO is part of the Earth Orbital Missions Office of the Science and Applications Directorate.

Add 1 MSC 70-80

The aircraft will stage out from Lima Calleo International Airport, Lima and overfly the several target sites at altitudes of 28,000 feet and 5,000 feet.

Frank Newman of the Aircraft Project Office is Mission Manager.

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NATIONAL AERONAUTICS AND SPACE ADMINISTRATION

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483-5111

July 16, 1970 BE4

Houston, Texas---One of the new minerals found in samples returned in America's first lunar landing has been named "Armalcolite" in honor of the Apollo 11 crew, Neil A. Armstrong, Edwin Aldrin, and Michael Collins.

The new mineral name incorporates the first few letters of each astronaut's name with "ite" added - Armalcolite. All modern mineral names must end in "ite."

Announcement of the new mineral name came nearly one year to the day the Apollo 11 lunar module landed in the Moon's Sea of Tranquility on July 20, 1969. Armstrong and Aldrin collected and returned approximately 47 lbs. of lunar material from their historic flight.

The mineral is a solid solution of ferrous iron titanium oxide and magnesium titanium oxide end members where the number of atoms of ferrous iron and magnesium in the molecule are approximately equal $(Fe_{0.5}^{2+}Mg_{0.5}Ti_2O_5)$. The pure end members are yet to be found in nature and the suggestion has been made that they should be referred to as ferro-armalcolite and magnesium armalcolite.

Announcement of the mineral name is included in the just released Proceedings of the Apollo 11 Lunar Science Conference of Geochemica et Cosmochemichia acta (cq). The Geochemica publication is also dedicated to the Apollo 11 crew. The mineral name has been approved by the Nomenclature Committee of the International Mineralogical Association.

70-82 Add 1

Also approved by the committee is the name of pyroxferroite which is a new iron-rich calcium-magnesium-iron bearing silicate.

Lunar samples scientists who discovered the new mineral and named it in honor of the Apollo 11 crew are Drs. A. T. Anderson, University of Chicago; T. E. Bunch, Ames Research Center; E. N. Cameron, University of Wisconsin; S. E. Haggerty, F. R. Boyd, and L. W. Finger of Geophysical Laboratories, Washington; O. B. James, U. S. Geological Survey, Washington, D. C.; K. Keil and M. Prinz, University of New Mexico; and P. Ramdohr and A. AlGorsi, Max Planck Institute, Heidelberg, Germany.

The new mineral was found both in the fine grain material as well as the rock samples returned by the Apollo 11 crew.

NATIONAL AERONAUTICS AND SPACE ADMINISTRATION

MANNED SPACECRAFT

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483-5111

70-83

July 29, 1970

Houston, Texas---The National Aeronautics and Space Administration has signed a supplemental agreement with North American Rockwell Corp., Downey, Calif., valued at approximately \$92,449,970 for changes in the Apollo command and service module contract.

The agreement formally incorporates into the North American contract a change to increase the mission duration, add a scientific instrument module (SIM) to accommodate lunar orbit experiments, and to provide experiment integration. Adjustments to the contract delivery schedules are also included.

The modification brings the total estimated value of the North

American cost-plus-fixed-fee/award-fee contract since August 1963 to

approximately \$3,724 billion.

The principal portion of the contract work is being performed at the California facility. Other divisions of the contractor, and many subcontractor organizations also participate. In addition, launch support operations will be performed at the Kennedy Space Center, Fla., and related test activities will be carried out at the Manned Spacecraft Center, Houston.

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NATIONAL AERONAUTICS AND SPACE ADMINISTRATION

MANNED SPACECRAFT NASA HOUSTON

483-5111

70-84 July 29, 1970

Houston, Texas---The National Aeronuatics and Space Administration has signed a supplemental agreement with the Grumman Aerospace Corporation, Bethpage, N. Y., valued at about \$7,974,400 for changes in the Apollo lunar module contract.

The agreement formally incorporates into the Grumman contract changes previously authorized by NASA for modification to the contractor's maintenance and repair program.

The modifications bring the total estimated value of the Grumman costplus-incentive-fee contract since January 1963, to approximately \$1,681 billion.

Grumman performs the majority of work on the lunar module contract at its Bethpage facility with support from its field offices in Houston, White Sands, and at the Kennedy Space Center.

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MSC 70-86 July 4, 1970 BE4

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HOUSTON, TEXAS--The National Aeronautics and Space Administration announced Tuesday the award of a \$856,000 contract to the Cutler-Hammer. Inc., Long Island, New York for design and development of an L-Band Microwave Radiometer for use in Skylab.

The contract which was awarded by the NASA Manned Spacecraft Center calls for Cutler-Hammer to design, develop and deliver the L-Band Microwave Radiometer (Skylab experiment S-104) flight hardware by October 15, 1971. Cutler-Hammer, Inc. is located in Melville, Long Island, New York.

Objective of S-194 is to obtain a measure of the brightness temperature of the terrestrial surface of the Skylab ground track. The brightness temperature will be measured in the L-Band portion of the specturm.

The S-194 system will consist of a radiometer sensor for external mounting on the Multiple Docking Adapter and a remote control unit which will be located within the spacecraft in an area readily accessible for astronaut operation of controls.

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NATIONAL AERONAUTICS AND SPACE ADMINISTRATION
MANNED SPACECRAFT NASA

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483-5111

70-87 August 13, 1970

The Manned Spacecraft Center now is open to the public 7 days a week from 9am until 4pm. Reservations are not required and there is no admission charge. The Center is closed on Federal holidays.

The Visitor Orientation Center, Building 1, has a collection of spacecraft and flight articles, as well as exhibits about America's Manned Space Flight Program. NASA films are shown throughout the day in the auditorium theater.

Visitors may take a self-guided walking tour through other designated areas including the Flight Acceleration Facility, Building 29; the Central Data Office, Building 12; and the Mission Simulation and Training Facility, Building 5. Souvenirs and light refreshments may be purchased in the Cafeteria, Building 3.

The Manned Spacecraft Center has a limited number of guided tours available from Monday to Friday only for adults and children at least 12 years old. Reservations are required. They should be made at least 2 weeks in advance by calling Area Code 713-483-4321 or by writing the Special Events Office, Code AP5, NASA Manned Spacecraft Center, Houston, Texas 77058. Include the exact number of visitors and children (12 years or older), and the specific date desired. Because of the large volume of requests for these tours, MSC cannot guarantee fulfilling requests except on a first come, first served basis.

483-5111

70-88 August 19, 1970

The NASA Manned Spacecraft Center today notified 175 employees they will be released as a result of cutbacks in the Civil Service work force at the Center.

At the same time, an additional 185 employees were informed they would be reassigned or placed in jobs at a lower grade. Twenty-three employees who were to be affected by the reduction plan to resign or retire.

The action came as part of a NASA-wide manpower reduction announced in July.

Of the 198 employees leaving 155 of them have jobs at the Houston Center. The remainder work at MSC field operations at Downey, California; Bethpage, New York; White Sands, New Mexico; and at the Kennedy Space Center, Florida.

MSC Director Robert R. Gilruth said, "Every effort will be made to assist employees who are being separated or reassigned to less attractive jobs through no fault of their own. We feel these people, many of whom worked directly on the moon landing program, have management and technical experience and abilities which will make them very valuable to other businesses and organizations."

MSC has set up an outplacement center for those affected by the reduction and has invited other Government agencies and commercial firms throughout the country to interview MSC employees for new positions. In addition, working closely with the Houston Chamber of Commerce and the Texas Employment Commission, 300 firms in the Houston area have been contacted and invited to interview NASA employees who would like to remain in this area.

Interested Government agencies and business firms will begin interviewing prospective employees at the Center at the end of August, and MSC will continue intensive efforts to place affected personnel in new jobs before September 30, when layoffs and reassignments take effect.

Among the 198 employees to leave, 79 are engineers and scientists with backgrounds in electronic, electrical, civil, mechanical, aerospace and general engineering and in the scientific fields of optics and meteoroid studies; 53 are technicians with backgrounds in electronics, construction, reliability and quality assurance, and drafting; 31 are administrative professionals in the fields of budget, procurement, supply, program planning and general administration; and 31 are clerks in the fields of supply and accounting.

Organizations wishing to review employee resumes or desiring to interview MSC employees for job openings are urged to contact Stanley Goldstein, Manager of the Outplacement Center, Mail Code BPX, NASA Manned Spacecraft Center, Houston, Texas 77058, phone (713) 483-4555.

NATIONAL AERONAUTICS AND SPACE ADMINISTRATION
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483-5111

MSC 70-89

August 23, 1970

HOUSTON, TEXAS--Joseph Nicholas Kotanchik, 61, Chief of the Structures and Mechanics Division, Engineering & Development Directorate, NASA-Manned Spacecraft Center, was stricken with a heart attack and died Saturday afternoon, August 22.

Kotanchik, a government employee for 32 years, joined the Manned Spacecraft Center in December 1961, as assistant Chief of the Systems Evaluation and Development Division. This division was responsible for the planning and development of design requirements leading to the construction of the Space Environment Simulation Laboratory, the Vibration and Acoustic Laboratory, the Structures and Materials Laboratory, the 10-Megawatt Arclet Facility and several other major test facilities of the Center.

In 1963, he was named to his current position and was responsible for the operation of these facilities in support of the Apollo program. His organization was responsible for management and technical direction involved in the development of many of the Apollo spacecraft subsystems including the structures, thermal protection, mechanical systems, earth landing systems and others. Mr. Kotanchik personally made many contributions toward the solution of many of the complex technical problems associated with the development of the lightweight spacecraft structures and with the retrofitting of the spacecraft interiors with fire resistant materials after the Apollo spacecraft fire in January 1967.

From November 1965 to August 1966, Kotanchik was attached to the Apollo Spacecraft Program Office as Assistant Manager for the Command and Service Modules.

Dr. Robert R. Gilruth, Director of the Manned Spacecraft Center, said "Mr. Kotanchik was highly dedicated and a key member of the management team of the Manned Spacecraft Center and had made many valuable contributions toward its development. He played a very vital and important role in the successful accomplishment of the landing of men on the moon. His loss will be deeply felt by the Center and by his many friends and associates in the technical community."

Kotanchik was graduated from the Massachusetts Institute of Technology in 1938 with a BS degree in Aeronautical Engineering. In October 1938, he joined the Structures Research Division of the Langley Research Center, at Langley Field, Virginia. There he conducted structures and materials research programs and participated in the development of facilities for structures and materials testing.

Under his direction at Langley, much of the development of high temperature experimental research based on quartz-tube-lamp radiant heating and electric-arc heating of gas streams was performed.

Kotanchik received the NASA Exceptional Service Medal in January 1969, for his contributions to the Apollo 8 Lunar Orbiting Mission and in October 1969, he received a second Exceptional Service Medal for his contributions to the Apollo 11 Lunar Landing Mission. He was a member of the American Institute of Aeronautics and Astronautics.

He was born November 17, 1908 in Ranshaw, Pennsylvania and was married to the former Mary Habura. They have two children, James, 27 of Arlington, Massachusetts and Joseph, 23, U.S. Army, Ft. McPherson, Georgia.

Final rites will be conducted Wednesday, August 26, in the Ukranian Catholic Church in Shamokin, Pennsylvania. The family requests in lieu of flowers, that contributions be made to the Heart Fund.

NATIONAL AERONAUTICS AND SPACE ADMINISTRATION

MANNED SPACECRAFT NASA HOUSTON

483-5111

MSC 70-90 8/24/70

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Houston, Texas

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The NASA Manned Spacecraft Center today announced plans to restructure and consolidate a number of its Support Service contracts, reducing the number of such contracts from 28 to 17.

MSC Associate Director Frank A. Bogart said the plan will cover a five year period, with all consolidations and recompetitions to be completed in about 2 years.

Consideration will be given to current contract periods, program impacts and budget cycles, he said; and five support services contracts will be set aside for competition among small businesses.

General Bogart said MSC should realize benefits in terms of better utilization of personnel and reduced overhead through the consolidation and restructuring of support contracts.

Current contracts for photographic sciences, the photographic laboratory operation and the making of precision slides for the Mission Control Center will be consolidated into a single photographic support contract.

Contracts for facility support, public affairs support, and logistical and technical information support will be combined into a single institutional support contract.

A consolidated electronic and computation services contract will replace present contracts for general electronic and instrumentation support; computer programming, operation and maintenance; and hybrid computer maintenance.

Present contracts for Mission Control Center engineering and operational support; Skylab flight crew procedures development, simulator maintenance and operation and communications command and telemetry system support will be consolidated into a new flight support contract.

Combined contract for program integration and engineering analysis will replace existing support contracts for integration analysis, reliability and quality assurance; spacecraft systems analysis; and technical integration and evaluation.

Consolidation was not considered feasible for the mission trajectory control program contract, clinical support, aircraft maintenance, laboratory support, mission computer support and protective services; and these contracts will remain separate.

Contracts for closed circuit television support, custodial services, motion picture production, rigging and heavy hauling, and central shop support will be set aside for competition among small businesses.

White Sands Test Facility contracts for laboratories and test stand operations, facilities maintenance and installation support, and security guard services will be phased out and replaced with a contract to maintain the New Mexico facility in reduced operational status.

TIONAL AERONAUTICS AND SPACE ADMINISTRATION

MANNED SPACECRAFT

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483-5111

August 24, 1970

HOUSTON, TEXAS---Ivy Fossler was cited recently by the National Aeronautics and Space Administration as one of four agency nominees for the 1969 Federal Woman's Award.

To be eligible, a woman must demonstrate "outstanding ability and achievement in an executive, professional, scientific or technical position.

Mrs. Fossler, who is senior engineer in the Applied Flight Dynamics section at the NASA Manned Spacecraft Center, was nominated for her contributions to the Apollo moon landing program and in the development of re-useable launch vehicles for post-Apollo programs.

In nominating Mrs. Fossler for the award NASA cited her for playing a major role in determining the wind conditions under which it is safe to launch an Apollo spacecraft. The analysis she performed continues to determine the launch wind restrictions for all Apollo launches.

Mrs. Fossler, formerly Ivy Hooks, and her husband Kenneth and daughters Paula and Cyd, reside in Friendswood, Texas. Mrs. Fossler received her BS and MS degrees from the University of Houston in 1963 and 1965. She has also attended Stephen F. Austin State College, Southwestern University, and Sam Houston State College.

Mrs. Fossler joined the NASA Manned Spacecraft Center in 1963.

TIONAL AERONAUTICS AND SPACE ADMINISTRATION

MANNED SPACECRAFT

483-5111

MSC 70-92 August 25, 1970

HOUSTON, TEXAS -- A test flight of a new 38 million cubic foot balloon system, designed to carry a 13,800 pound payload to an $\mathfrak P$ altitude of more than 21 miles is scheduled to be launched for the National Aeronautics and Space Administration from Holloman Air Force Base, New Mexico on or about August 26, 1970.

This launch will test a new polyethylene balloon which has been developed for NASA's project CRISP (Cosmic Ray Ionization Spectrograph Program).

CRISP is intended to measure cosmic radiation at an altitude of around 108,000 feet. On November 6, 1969 a 34 million cubic foot balloon was launched in this program, but ended prematurely when the balloon failed to rise to its assigned altitude because of a separation in the balloon panels.

This launch is intended to test the new balloon and will carry a dummy payload. If this launch is successful, the instrumented CRISP payload will be launched in October. The experiment is designed to provide significant new scientific information about the high energy cosmic radiation and to develop future scientific experiments which will have application to manned space missions.

The CRISP balloon and payload will stand nearly 1,000 feet tall. After attaining its float altitude, 108,000 feet, it will drift westward and be recovered in Arizona.

The balloon is a two part interconnected system. For launching, the top balloon will be inflated. As the balloon rises, the gas expands and is forced into the much larger main balloon. The expanding helium flows through a connecting transfer duct which is the collar like ring which joins both balloons. Nearly 16 acres of plastic film go into the making of the CRISP balloon.

Add 1 MSC 70-92

The balloon will be launched and controlled during its flight by personnel from the balloon R&D Test Branch at Holloman Air Force Base, which is a unit of the Air Force Cambridge Research Laboratory under Air Force Systems Command.

CRISP is a project of the Science and Applications Directorate, NASA Manned Spacecraft Center, Houston, Texas.

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NATIONAL AERONAUTICS AND SPACE ADMINISTRATION
MANNED SPACECRAFT
NASA
CENTER NASA
1, Texas

483-5111

MSC 70-93 August 26, 1970

HOUSTON, TEXAS---Representatives of national fire safety organizations today will meet with National Aeronautics and Space Administration Manned Spacecraft Center engineers to discuss and inspect fire-fighting garment concepts developed for the manned space flight program. The meetings will explore the possibilities of adapting the specialized fire-fighting garments and equipment to general use.

Representatives of the International Association of Fire Chiefs, International Association of Fire Fighters, the National Fire Protection Association and the National Bureau of Standards will meet with Matthew I. Radnofsky of the Center's Crew Systems Division. Examples of fire-fighting garment concepts such as the proximity fire fighting suit, the rescue garment and the fire entry suit--all developed for launch pad and training vehicle rescue work and made of fire retardant fabrics---will be demonstrated.

Radnofsky's group at the Center has been working with industrial and fire safety groups in making space-evolved fire-retardant materials and technology available for other applications.

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NATIONAL AERONAUTICS AND SPACE ADMINISTRATION

483-5111

September 8, 1970

MSC 70-98

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Two European companies will join with U.S. firms in design studies of a space shuttle for possible manned flight missions of the late 1970s and beyond.

Messerschmitt-Boelkow-Blohm, of West Germany, and the British Aircraft Corp. (BAC) will conduct sub-systems studies as subcontractors to North American Rockwell's Space Division, which heads one of two U. S. industrial teams under contract to the National Aeronautics and Space Administration for shuttle definition and preliminary design studies.

The European companies work will be financed by their respective governments at no cost to North American Rockwell. They will assign portions of their engineering teams to work at North American's Space Division in Downey, California.

Messerschmitt-Boelkow-Blohn will study the shuttle's attitude-control rocket system, and BAC will investigate structures, aerodynamics, flighttest instrumentation, and data handling.

The space shuttle is envisaged as a reusable airplane-like vehicle for carrying people and cargo between Earth and low Earth orbit at greatly reduced costs compared with present expendable launch vehicles.

Definition and preliminary design studies for the shuttle are also being made for NASA by a team of U. S. aerospace firms headed by McDonnell-Douglas Corp., St. Louis.

NATIONAL AERONAUTICS AND SPACE ADMINISTRATION
MANNED SPACECRAFT
NASA

CENTER NASA

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483-5111

September 9, 1970

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HOUSTON, TEXAS---Athletes, typists, musicians and many other professions must use their talents on a regular basis or face the loss of the acuity that makes them first rate, and so it is with flight controllers for a mission in space.

With the extended periods between space flights, to allow more time for analysis of information acquired, and assimilation of this into follow-on flight plans, there is a period of time when the activity level in flight control drops off.

To counteract the possible loss of the keen vigilance required on the consoles in Mission Control Center, the Flight Control Division at the Manned Spacecraft Center has instituted a proficiency simulation program for flight controllers.

Prior to the time period when active simulations begin for a flight, a series of proficiency simulations will be scheduled. At least two full simulations will be conducted in Mission Control Center each month, normally at two-week intervals.

Flight controllers scheduled to be assigned to the upcoming mission, in this case Apollo 14, will man their consoles in MCC during these bi-weekly simulation sessions for an eight to ten hour proficiency exercise designed especially to keep them up-to-speed in the respective disciplines.

The simulations will alternately be the Apollo Command Module and Lunar Module during some mission phase, with a computer program furnishing the spacecraft telemetry readouts for the flight controller consoles.

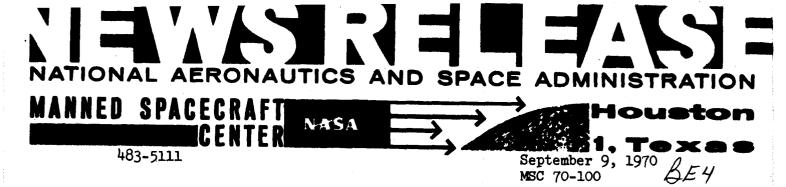
The first of these simulations was conducted late last month for the Apollo 14 flight controllers.

This proficiency simulation program is now planned as a part of the flight controller training for all subsequent Apollo missions.

In addition to these simulations, flight controllers have other tools available to them, notably the Command and Lunar Module cockpit familiarization units maintained and operated by the Crew Station Trainer Systems Group. These units are available for flight controller scheduling on a daily basis and have been very valuable in familiarizing the flight controllers with the inner workings of the spacecraft cockpit on previous missions.

Classroom sessions and smaller group meetings are also utilized by the Flight Control Division to help the flight controllers maintain a level of knowledge and proficiency necessary to the performance of their job.

When the world next hears the call "Apollo 14 this is Houston" the trained and proficient team of controllers behind the scene will not have materialized by chance, but by design.



HOUSTON, TEXAS---The National Aeronautics and Space Administration is establishing an Earth Resources Laboratory at the Mississippi Test Facility, Hancock County, Mississippi effective today.

The laboratory is to be directed by the NASA Manned Spacecraft Center in Houston and will employ about 75 government and contractor personnel initially, with a planned growth to about 185 over the next two years.

Robert O. Piland, Deputy Director of Science and Applications at MSC, has been named to head the new laboratory.

The effort at MTF will stress research in the applications of remote sensing techniques using data generated by Earth Resources aircraft flying out of Houston, the Earth Resources Technology Satellites (first launch planned for 1972), and on the manned orbiting Skylab spacecraft scheduled to be launched in 1972.

The information gathered by aircraft and spacecraft will be correlated with data gathered on the surface and will be analyzed for potential benefits to such area interests as seafood, forestry, and agriculture, as well as erosion and pollution monitoring of the Gulf Coast and area growth planning.

The new laboratory will complement and supplement Earth Resources programs underway at NASA's Goddard Space Flight Center, Greenbelt, Md., and at the Manned Spacecraft Center,

Experts in physics, geoscience, instrumentation, and data handling will be brought in to staff the facility.

NATIONAL AERONAUTICS AND SPACE ADMINISTRATION MANNED SPACECRAFT NASA CENTER NASA 1. TOXAGE

483-5111

MSC 70-101 September 15, 1970

HOUSTON, TEXAS---The National Aeronautics and Space Administration has selected Singer-General Precision Inc., Link Division, Houston, Texas for award of a contract to design, develop, install, and support a Skylab simulator for astronaut and ground crew training at the Manned Spacecraft Center, Houston.

The estimated value of the cost-plus-award-fee contract is \$4 million. Five companies submitted proposals for this work. Delivery of the Skylab simulator is scheduled for late 1971.

The Skylab simulator will operate as a ground based trainer for controls and displays utilized during manned operation of the Skylab, and also will be operated in conjunction with the command module simulator and the Mission Control Center to provide full mission training.

Tasks included under the contract are collection of solar data for the production of solar image graphics; production of computer programs for simulation of various mission phases including active controls and displays; review of spacecraft changes and incorporation of appropriate changes into the simulator design; and preparation of operations and maintenance manuals and interface control documents.

Skylab, scheduled to be launched in November 1972, consists of a modified Saturn V third stage outfitted on the ground as living and working quarters for three astronauts and includes a solar observatory called the Apollo Telescope Mount, an air-lock module, and a multiple

docking adapter. The first flight crew will occupy and work in the Skylab for up to 28 days, with two subsequent crews remaining in the Skylab for periods of up to 56 days.

In addition to solar astronomy experiments, the Skylab will provide facilities to develop data on man's capabilities to operate for extended periods in Earth orbit, to make meteorological and Earth resources observations, and to carry out medical, scientific, and technical experiments.

The contract will be administered by the Manned Spacecraft Center, Houston, under the direction of NASA's Office of Manned Space Flight, Washington.

NATIONAL AERONAUTICS AND SPACE ADMINISTRATION

MANNED SPACECRAFT NASA Houston
CENTER NASA 1, Texas

483-5111

September 22, 1970 MSC 70-103

HOUSTON, TEXAS -- The balloon borne scientific payload which crash landed in a Canadian field over the weekend suffered little if any damage.

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Scientists at the NASA Manned Spacecraft Center said the payload "miraculously came through it in excellent condition." The 1,200 pound instrument package landed in a flax field 20 miles west of Regina, Canada, after being separated from its 600-foot long balloon.

The balloon and scientific package drifted for more than 347 hours, covering a distance of about 4,800 miles -- 1,700 over the Pacific Ocean -- following its launch from Minneapolis, Minnesota on September 4. The experiment was scheduled to be concluded 48 hours after launch; however, a faulty descent system kept the balloon aloft for more than two weeks.

The project, part of MSC's investigations of cosmic rays, is the Cosmic Ray Emulsion Plastic Experiment. The experiment consisted of 240 square feet of detectors housed in 20 by 12 foot package.

The detectors -- plastic track, nuclear emulsion, and fast-film

Cernekov -- are designed to record the intensity and direction of

transiron primary cosmic rays in the upper atmosphere (130,000 feet

altitude). The balloon and payload was launched by the Winzen Research

Corporation in cooperation with the National Center for Atmospheric

Research (NCAR).

The payload was recovered from Canada by NASA, Winzen and NCAR scientists and taken to the University of California, Berkley, where preliminary analysis is being conducted under the supervision of U of C Professor Berford Price, coinvestigator. It will be another 90 days before detailed analysis is completed.

Dr. Zack Osborne, MSC co-investigator, said "Although the pay-load hit hard, preliminary examination of the detectors indicates we were very lucky."

The balloon and its payload drifted west for several days after launch and then crossed over the Pacific Ocean where it drifted west for about 750 miles. Westerly winds then caught the package and returned it to the states.

It crossed into Canada sometime Friday night and crashed into a series of power lines the following morning where the balloon was separated from the payload. The balloon, still containing a portion of its 20.8 million cubic feet of helium, drifted eastward and fell to a point near Brandon, Canada -- about 100 miles north of Winnipeg.

NATIONAL AERONAUTICS AND SPACE ADMINISTRATION

MANNED SPACECRAFT NASA Houston CENTER NASA 1, Texas

483-5111

September 30, 1970 MSC 70-1040

HOUSTON, TEXAS--A new program designed to minimize possible exposure of future Apollo flight crews to disease or illness will be introduced 21 days prior to the launch of Apollo 14.

The program, called the Flight Crew Health Stabilization Program, will provide close medical surveillance of the crew and those persons with whom they work closely. The program also will control and limit the number of persons having contact with the crew and limit the crew to areas where microbial contamination is minimized.

Dr. Charles A. Berry, Director of Medical Research and Operations at the NASA Manned Spacecraft Center, said "The most important factors in making this plan to reduce the possibility of crew illness effective, are awareness of, acceptance of, and emphasis on preventive medicine by all management levels and by flight crews."

The program generally provides for:

- Crew health to be stabilized by implementation of epidemiology, clinical medicine, and immunology programs, and limitation of the number of outside contacts with the flight crews.

-more-

- Crew members (prime and backup) will reside solely in the Crew Quarters while at the Kennedy Space Center for a period of 21 days prior to launch.
- Access to primary training areas utilized by crew members will be controlled by the KSC security forces while occupied by flight crews.
- Access to areas during crew occupancy will be limited to properly badged primary contacts, or by waiver from the Director of Flight Crew Operations and subject to medical clearance from the Director of Medical Research and Operations.
- The major scope of crew activities will be limited to the primary areas of the Manned Space Operations Building (MSOB) and Flight Crew Training Building (FCTB), the flight line, and launch pad white room during the 21 day prelaunch period. Primary areas of the MSOB and FCTB are those areas with special air conditioning. Crew access to other than these areas requires special approval.
- Crew members will use personal vehicles when traveling from one primary area to another. The transfer van will be used when crew members travel from MSOB to the launch pad.

In the event crew members are required to be at MSC for training purposes they will reside in their own residence or the crew reception area of the Lunar Receiving Laboratory. Appropriate security controls will be implemented if crew members choose to stay in their homes while at MSC and children and everyone but the wife who is a primary contact will be excluded.

Add 2 MSC 70-104

During 60 days prior to launch all illnesses occuring in family members of prime, backup, and support crews, as well as close contacts of these families will be reported to medical officials.

Primary contacts (wives, backup crew members, mission essential personnel) will be given physical examinations as early as 90 days prior to launch. Those stationed at Houston will receive their physicals 45 days prior to launch.

The follow-on medical surveillance which will be supervised by the Medical Research and Operations Directorate is expected to maximize the possibility that those who come in contact with the crew prior to launch are healthy. The medical personnel at MSC and KSC will maintain and evaluate information relating to crew movements, crew health, primary contact and family health and community health as well as environmental monitoring of the primary areas, food and water.

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NATIONAL AERONAUTICS AND SPACE ADMINISTRATION MANNED SPACECRAFT NASA CENTER NASA 1, Texas

483-5111

September 24, 1970 MSC 70-105

HOUSTON, TEXAS--Brazilian space teams will launch two separate scientific payloads for the National Aeronautics and Space Administration from Natal, Brazil, to evaluate the radiation environment over the South Atlantic. The launches are scheduled for September 25 and September 30.

The scientific experiments were developed by NASA and the University of California. Purpose of the two flights is to provide detailed scientific measurements of the charged particle environment in the South Atlantic Anomaly region, a region of trapped radiation located over the South Atlantic Ocean.

Scientists and engineers from two NASA centers -- the Manned Space-craft Center at Houston, Texas, and the Goddard Space Flight Center, Greenbelt, Maryland -- and the University of California are working together on the projects.

NASA is being assisted in the program by the Brazilian Air Force, the Brazilian National Space Commission (Commisso Nacional de Actividaes Espaciaia) and working with personnel at the Barreria de Inferno range.

Launch vehicle for the two separate scientific probes is the Black
Brant IV, a two-stage solid-propellant vehicle. Each payload will be
boosted to an altitude of about 530 nautical miles above the South Atlantic.

The payloads and flight parameters are identical. Each payload weighs 110 pounds and the mission duration from launch to impact is $15\frac{1}{2}$ minutes.

The first flight, scheduled for launch between midnight and two a.m. on September 25 carries a Positive Ion Telescope (PIT), Integral Flux Spectrometer (IFS), and two magnetometers.

The Positive Ion Telescope, developed by the University of California, is designed to obtain data pertaining to protons trapped at low altitudes.

The Integral Flux Spectrometer (IFS), developed by scientists at the NASA Manned Spacecraft Center, is designed to gather detailed information relating to the distribution of charged particles in the anomaly.

The magnetometers -- flight one carries two and three will be aboard the payload on flight two -- are designed to determine the magnitude and direction of the magnetic fields at points along the 507 mile long trajectory.

Flight two, in addition to carrying a PIT and the magnetometers, will have the Corona Discharge Experiment (CDE). The CDE, developed by the NASA Goddard Space Flight Center, is intended to provide a representative pressure within the experiment hardware during flight.

Measurements within the Anomaly will begin when the rocket and payload reach 447,500 feet at 57 seconds into the flight. The experiments will transmit data to the ground stations at Barreria do Inferno range. Data will be collected on magnetic tapes for evaluation by NASA and university scientists.

The second stage and its payload is scheduled to land in the ocean 225 miles downrange from the launch site. It is not planned to recover either of the instrument packages.

MSC's Space Physics Division, of the Science and Applications
Directorate, which designed and fabricated the experiment instrumentation,
is directing the program. The Sounding Rocket Branch of NASA's Goddard
Space Flight Center, Greenbelt, Maryland, is assisting in the launch
and data recovery.

The Black Brant is manufactured by Bristol Aerospace Limited, Winnipeg, Canada. In addition to furnishing the rockets and related hardware, Bristol trained the Brazilian launch crews at Natal.

NATIONAL AERONAUTICS AND SPACE ADMINISTRATION

483-5111

September 24, 1970 MSC 70-106

HOUSTON, TEXAS -- The National Aeronautics and Space Administration has modified its contract with RCA, Camden, N.J., for final development and production of lunar communications relay units.

Estimated value of the cost-plus-fixed-fee contract is \$3 million. Total value of the contract is estimated at \$10 million.

The lunar communications relay units (LCRU) will transmit astronaut voice, television, and telemetry communications from the Moon directly to Earth. The first of the flight units is scheduled for delivery in June 1971.

Currently, these transmissions are relayed to Earth through the lunar module. Beginning with Apollo 15, however, astronauts will ride an electrically powered vehicle called the Lunar Rover which will take them out of line of communications with the lunar module. The LCRU will be carried on the Lunar Rover and will relay transmissions directly to Earth. It will also receive voice communications and telemetry commands from Earth.

The relay unit will consist of a VHF AM receiver and transmitter, S-band receiver and transmitter, VHF voice antenna, S-band low-gain antenna and S-band high-gain antenna. It will be powered by a selfcontained battery or by lunar rover electric power. The entire LCRU less antennas will have an Earth weight of about 50 pounds (less than nine on the Moon), and it will be packaged in a container about the size of a small suitcase (13 x 21 x 5 inches).

Add 1 MSC 70-106

The LCRU will permit live color television coverage of astronauts exploring the lunar surface. It will also make possible television coverage of the lunar module liftoff from the Moon's surface.

The LCRU will be operated primarily from the Lunar Rover. It could also be operated from the modularized equipment transporter -- a two wheel handcart, or in an emergency it may be carried by an astronaut.

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NATIONAL AERONAUTICS AND SPACE ADMINISTRATION
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483-5111

September 29, 1970

MSC 90-109

HOUSTON, TEXAS--Eight firms have submitted proposals for a new institutional support services contract at the NASA Manned Spacecraft Center, Houston.

The contract is the first of a series of MSC contracts to be restructured and consolidated to utilize personnel more efficiently and to reduce support contract overhead.

The new institutional support contract will combine the functions of two existing contracts with Service Technology Corporation (STC), valued at about \$11.4 million and an existing contract with ITT Federal Electric Corporation valued at about \$3.3 million. It will include responsibility for facility support, public affairs support and logistical and technical information support.

Industry proposals will be evaluated and a contract will be awarded early in 1971.

About 900 personnel will be employed under the new consolidated contract compared with about 1,100 contract employees required under the three existing contracts.

The Manned Spacecraft Center announced plans in August to reduce the number of support service contracts from 28 to about 17 through restructuring and consolidation.

IONAL AERONAUTICS AND SPACE ADMINISTRATION MANNED SPACECRAFT

483-5111

October 1, 1970 NA MSC 70-110

HOUSTON, TEXAS --- The NASA Manned Spacecraft Center is nogotiating with Lockheed Missiles and Space Company, Sunnyvale, California for a study of space shuttle cryogenic systems.

The contract calls for an engineering study aimed at making shuttle cryogenic systems as functional and effective as possible.

Major objectives of the 18-month study is to review and define mission requirements, and then select system concepts to meet these requirements.

Also called for is an analysis of tank configurations, pressurization and insulation concepts and other factors which might significantly influence cryogenic system performances.

Estimated value of the cost-plus-fixed contract is \$699,000.

NATIONAL AERONAUTICS AND SPACE ADMINISTRATION MANNED SPACECRAFT NASA CENTER 1. Toxoo

483-5111

October 7, 1970 MSC-70-111

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HOUSTON, TEXAS---The National Aeronautics and Space Administration has signed a supplemental agreement with the Grumman Aerospace Corp. valued at about \$7,784,000 for changes in the Apollo lunar module contract.

The agreement formally incorporates into the Grumman contract 107 changes previously authorized by NASA for modification to the contractor's procedures for: flight anomaly investigations, for modification to flight and ground test hardware, for additional ground support equipment, and for incorporation of the IM System Safety Program Plan. The modifications bring the total estimated value of the Grumman contract since January 1963 to approximately \$1,717,498,000.

Grumman performs the majority of work on the lunar module contract at its Bethpage, N. Y. facility with support from its offices in Houston, White Sands, N. M., and at the Kennedy Space Center, Fla.

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NATIONAL AERONAUTICS AND SPACE ADMINISTRATION MANNED SPACECRAFT NAME OF THE PARTY O

483-5111

October 1, 1970 MSC 70-111

HOUSTON, TEXAS--In 1969, following the Apollo 11 mission, nine and possibly ten additional lunar landings were planned.

Since then one mission, Apollo 12, has been completed successfully, another, Apollo 13, has been aborted without landing, and three other missions have been dropped from the lunar program.

The determination of scientific objectives and landing locations for each flight has taken on added significance with only four lunar missions remaining and only two landing sites still to be selected.

From the original lists of a dozen or more candidate landing sites, five locations have been discussed most actively as potential sites for Apollo 16 and 17 by NASA site selection groups and at scientific meetings such as the September conference in Houston on The Structure, Composition and History of the Lunar Surface.

These potential sites are the very ancient volcanic terrain of Descartes in the central lunar highlands; the very bright crater Tycho in the southern lunar highlands; the crater-rille chain at Davy in the northeastern corner of Mare Nubium; the Marius Hills, which sit astride the Moon's largest continuous ridge system, radiating out from the Fra Mauro formation -- an area similar to volcanic structures in Iceland or at Flagstaff, Arizona; and the three-thousand-foot-high central peaks of the crater Copernicus.

The proposed site at Descartes (8 degrees 51 minutes south and 15 degrees 34 minutes east) is between two small craters on a highland plain near ejecta which comprises some of the brightest material on the lunar surface. The site offers the opportunity to sample typical old highland terrain from the central mass of the highlands rather than from the periphery.

It has been suggested that this region of the Moon, with its fissures, grooves and hills, was formed by volcanic activity. The occurrence of such processes would be of fundamental importance in understanding the origin of lunar highlands. Even more interesting is the possibility of finding surfaces that have remained essentially unchanged since the Moon was first formed.

Samples from the Descartes site would be important in determining whether or not highlands were formed by a very early differentiation of the Moon or whether they represent a primitive, undifferentiated planetary surface.

The suggested target at the Davy site (10 degrees 52 minutes south and 6 degrees west) is a chain-of-craters rille with its eastern end in highland material forming the rim of the crater Davy Y and its western end in the floor of Davy Y in upland basin fill. Davy would offer an excellent opportunity to sample at once old highland fill, old highland ridge material and young craters. It is suggested that the craters forming the rille were caused by explosive eruptions which ejected material from 100 kilometers (60 miles) or more beneath the lunar surface. Such deep-seated material would provide direct evidence of the age, composition and physical properties of the lunar interior and

would be of great importance in understanding the past and present physical state of the Moon.

A major problem with the Davy site is that neither Lunar Orbiter photography nor Apollo photography to date provides adequate coverage for mission planning. It does not appear likely that adequate photography of Davy will be obtained on Apollo 14 or 15.

Marius Hills, a group of domes and cones near the center of Oceanus Procellarum, is the most westerly site proposed for an Apollo landing. The tentative landing site (14 degrees 36 minutes north and 56 degrees 34 minutes west) is in the vicinity of the greatest variety and most complete collection of volcanic-like forms on the lunar surface. The volcanic complex lies along a major ridge system which has been compared to terrestrial mid-ocean ridges with volcanic plateaus such as Iceland and the Azores. The age of the Marius Hills complex will establish a minimum age for the internal generation of lunar magma, a required step in determining the thermal history of the Moon. Samples from this site may also show changes in magma composition which can be correlated with time to reconstruct the history of interior lunar processes.

Unlike other sites which offer both highland and mare materials for sampling, Marius Hills appears to offer little hope of yielding any highland material.

The crater Tycho, 80 kilometers (nearly 50 miles) in diameter, is the most prominent of all rayed lunar craters, and at full moon it dominates the southern part of the lunar highlands and is visible to the naked eye.

The proposed landing site is on the crater rim (40 degrees 56 minutes south and 11 degrees 15 minutes west) near the area where Surveyor VII landed January 10, 1968. No other crater is like Tycho in that it is the focus of the most extensive system of bright rays on the lunar earthside. Tycho is also the last major impact event in lunar history. Samples from ejecta of the crater could provide material from 5 to 10 kilometers (3 to 6 miles) beneath the lunar highlands.

Tycho is farther from the lunar equator than any landing site thus far proposed and would require a spacecraft trajectory far removed from a free-return flight path. It is also the most difficult landing terrain to be considered.

The risks of landing at Tycho would have to be weighed against the scientific return from this very interesting site, returns which may, in part be obtainable at other sites.

The crater Copernicus is similar in many respects to Tycho. It is a large crater (diameter 95 kilometers or about 57 miles) with terraced walls, central peaks and brightly rayed ejecta. The proposed landing site is on the crater floor about three kilometers (less than two miles) from one of the central peaks (9 degrees 52 minutes north and 19 degrees 55 minutes west). Scientists believe Copernicus may have been formed by the explosive impact of a meteorite which punched a hole through the lunar crust, exposing underlying material and causing the floor of the crater to rebound and uplift into the central peaks which have drawn

Add + MSC 70-111

material from 5 to 10 kilometers (3 to 6 miles) beneath the lunar surface. Copernicus is also thought to have been formed by one of the younger events in lunar history and to be a key in dating other lunar features. Samples from the floor of Copernicus will give clues as to the differentiation or layering of the Moon. And material which has come from the central peaks may answer questions on the Moon's interior composition and structure.

Copernicus, like Tycho, presents a difficult landing problem; however, experience gained on the Apollo 14 and 15 missions could overcome these problems.

Other landing sites have also been discussed and are not ruled out for future missions.

Selection of future sites will depend in large part on the results and scientific findings from preceding missions.

NATIONAL AERONAUTICS AND SPACE ADMINISTRATION
MANNED SPACECRAFT

CENTER

ASA

1. Texas

483-5111

October 9, 1970 MSC 70-112 RE4

Houston, Texas--The NASA Manned Spacecraft Center has selected the Northrop Corporation, Electronics Division, Norwood, Massachusetts to negotiate a contract for 25 inertial reference integrating gyros (IRIG's) to be used in Apollo and Skylab spacecraft guidance systems.

The stable platform used as an inertial attitude reference in the command module guidance and navigation subsystem contains three IRIG's mounted perpendicularly to each other.

Total cost of 25 gyros will be about \$997 thousand. The contract will also give NASA the option to but up to 25 additional gyros for approximately \$600 thousand.

Northrop was selected to negotiate a contract from among two firms responding to an MSC request for proposals.

The contract will require Northrop to deliver the first three flight qualified gyros seven months after an agreement is signed, with all 25 units to be delivered within 13 months.

IRIG's are incorporated into the spacecraft inertial measurement unit by AC Electronics, Milwaukee, Wisconsin, prime contractor for the Apollo Guidance and Navigation subsystem.

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NATIONAL AERONAUTICS AND SPACE ADMINISTRATION MANNED SPACECRAFT NASA CENTER NASA 1. Toxon

483-5111

October 8, 1970 MSC 70-113

HOUSTON, TEXAS---A man considered by many in the scientific community to be one of the pioneers of modern remote sensing, is personally convinced man must change his ecology in order to survive.

"And we here at the Manned Spacecraft Center can prove helpful in the process of change," says Marvin R. Holter new Chief of the Earth Observations Division of the Science and Applications Directorate. A veteran of 25 years in remote sensing development systems, Holter said NASA's earth resources program is one of the tools which can be utilized in expanding man's understanding of his environment.

"The program (earth resources) is entering a change of phase," he explained. "I anticipate we will be putting our technology, as it exists today, to practical applications."

Holter who admits man has made ecological mistakes said, "we've reached the point where we can't make any more mistakes. We have to change our ecology in order to survive."

The earth resources survey program, a small but major activity at MSC for the past six years has developed the technology and has amassed photographic and sensing data useful in man's understanding of his environment.

"We now have the power (through aircraft and spacecraft sensing)
to predict change, in advance," Holter explained "and at the same time
to be able to predict what effect such changes will have on our ecology."

MSC aircraft have during the past six years logged thousands of hours flying missions for government and university scientists gathering data on agriculture, forestry, geology, geography, hydrology and oceangraphy.

"During the next year," Holter said, "we will be applying this ability and technology to the Lake Ontario project, among others.

The lake project is part of the work being carried out by the International Hydrological Decade (IHD). The IHD, a group of international organizations dedicated to advance our knowledge of the extent and amount of rainfall, depth and desity of snowpacks and levels of rivers, lakes and irrigation reservoirs.

Primary purpose of the Lake Ontario project, Holter said, is a study of the lake and its water shed; including agriculture, industrial and urban activities along the 180 by 60 mile lake. The RB57, one of the three MSC aircraft used in the earth resource survey program has already made one flight over the lake and is tentatively scheduled to fly early several missions early next year and gather photographic and other sensing data over a 100,000 square mile area.

"We welcome the request to take part in this project,"Holter explained. "The program (earth resources) cannot be a success unless there are a number of activities--such as hydrology decade-- which succeed, "he said.

Holter, who came to MSC from the University of Michigan where he was a professor on remote sensing, said the technology and data is available, the next step is to put this practical application.

Author and co-author of about two dozen publications on remote sensing and data systems, the Earth Observations Division Chief is "tremendously excited and interested" in MSC's future role in earth resources.

"Personally," Holter said, I feel we are involved in the survival of the human race."

Holter, his wife Frances and their two pre-school daughters now call El Lago home, far from the campus of the University of Michigan where he spent 23 years.

Born in Fairport, N. Y. in 1922, Holter said he will miss his 13-acre farm which he worked as a hobby in Ann Arbor. However, he is looking forward to pursuing his other hobbies amateur radio, photography and reading.

Holter received a BS in physics from the University of Michigan in 1949, an MS in math in 1951 and an MS in physics in 1958. He held numerous positions at the university, the most recent being professor of remote sensing and head of the sensing laboratory.

NATIONAL AERONAUTICS AND SPACE ADMINISTRATION MANNED SPACECRAFT HOUSTON

483-5111

October 15, 1970
MSC 70-114 RF 4

HOUSTON, TEXAS---An audible alarm to alert flight controllers of potentially hazardous conditions onboard the Apollo spacecraft, has been added in Mission Control Center to augment the caution and warning system used on past flights.

The critical limit/event alarm system was implemented by the Flight Support Division of the NASA Manned Spacecraft Center as part of the preparations for the MCC internal validation to ready the control center for the upcoming Apollo 14 simulations and mission.

Augmentation of the dual limit sense/alarm requirement was based on the Apollo 13 Review Board recommendations and was developed as a part of the Real Time Computer Complex (RTCC). Flight controller requirements for the system were supplied by the Flight Control Division.

Eleven consoles in Mission Control are equipped with a varying number of visual and audible alarms to warn when a given parameter exceeds a preset value. Four of the consoles are in the Mission Operations Control Room and the remainder are located in the staff support rooms located around the main control room.

The eleven consoles are all systems engineering consoles and include the following flight control functions concerned with the command and service module (CSM) and the lunar module (IM): CSM environmental/electrical communications engineer (EECOM); CSM guidance/navigation/control systems engineer (GNC); IM environmental/electrical systems engineer (TELMU); and LM guidance/navigation/control systems engineer (CONTROL).

Software and nardware for the critical alarm system were tested this week during the MCC internal validation to certify that the control center is all up and ready to support simulations for Apollo 14.

When a parameter monitored by one of the above groups of flight controllers indicates an alarm (out-of-limits or event) an audible alarm will sound and a red indicator on the console will light.

The audible alarm is an 800-cycle-per-second tone interrupted six times per second emitting a bleeping sound which transmits a sense of urgency. All critical alarm lights for this system are grouped on the consoles to avoid possible confusion with other warning lights.

The above tone was selected because it does not interfere with the normal voice transmissions. Once an event has exceeded limits, the alarm sounds for a preset period and then turns off, but the warning light remains on until the event is back within limits.

Reconfiguration of MCC for Apollo 14 started in May of this year in accordance with mission requirements. This required implementing all events, analogs, digital television, and communication requirements that are unique or different for Apollo 14.

Work on the Dual Limit Sense/Alarm System was begun the latter part of July. The internal MCC validation after weeks of individual system testing was completed October 13 by the Flight Support Division.

MCC internal validation testing includes integrating the RTCC, CCATS (communications, command and telemetry system), display systems, and the Apollo simulators at Kennedy Space Center in Florida. The Apollo simulators in Houston were tied-in and validated earlier to facilitate flight controller proficiency sims which began early in September.

Other tests to be conducted prior to the mission include interface with the Apollo Launch Data System (ALDS) which is the telemetry system at KSC. This is scheduled for sometime next week.

The MCC/Launch Pad interface test with the Goddard Space Flight Center MILA Unified S-Band (USB) station is scheduled early in December. This will be followed by the launch vehicle redundancy tests and the flight readiness test (FRT).

Two days of testing in the middle of January of next year will be required for the MCC/Network Validation. This testing will be completed three days prior to the CDDT (Countdown demonstration tests) at KSC. These tests will consist of running communications, command telemetry, air/ground, and tracking tests with each station on the MSFN (Manned Space Flight Network). When this is completed the entire data system will be ready to support the Apollo 14 mission.

NATIONAL AERONAUTICS AND SPACE ADMINISTRATION

MANNED SPACECRAFT
NASA

1. Texas

October 20, 1970
MSC 70-117

HOUSTON, TEXAS--The NASA Manned Spacecraft Center today announced plans for construction of a barge dock and waterway in Clear Lake adjacent to MSC to handle shipments of large Skylab test articles.

It is expected contracts will be awarded and construction begun early in November on the project, which will cost between \$100,000 and \$130,000.

A contract will be awarded by MSC for construction of a barge dock adjacent to NASA Road 1 at the east side of the MSC site. A separate contract will be awarded through the Corps of Engineers for dredging of a waterway 7 feet deep, 60 feet wide and about 3,000 feet long, from the proposed dock to the existing Federal waterway in Clear Lake.

The project is to provide a docking facility and waterway for the S-IVB barge and Skylab test articles being shipped to MSC for testing from NASA's Marshall Space Flight Center, Huntsville, Ala.

The first test article -- a 22-foot-diameter, 36-ton Orbital Workshop Dynamic Test Article -- is scheduled for delivery to MSC in mid-December for acoustic and vibration testing the first quarter of next year. A second article -- an Orbital Workshop one-G trainer weighing 50 tons -- is scheduled for delivery the first of April, 1971. Other Skylab test articles, including the Apollo Telescope Mount, the Airlock Module and the Multiple Docking Adapter will also be shipped between MSC and MSFC via barge during 1971.

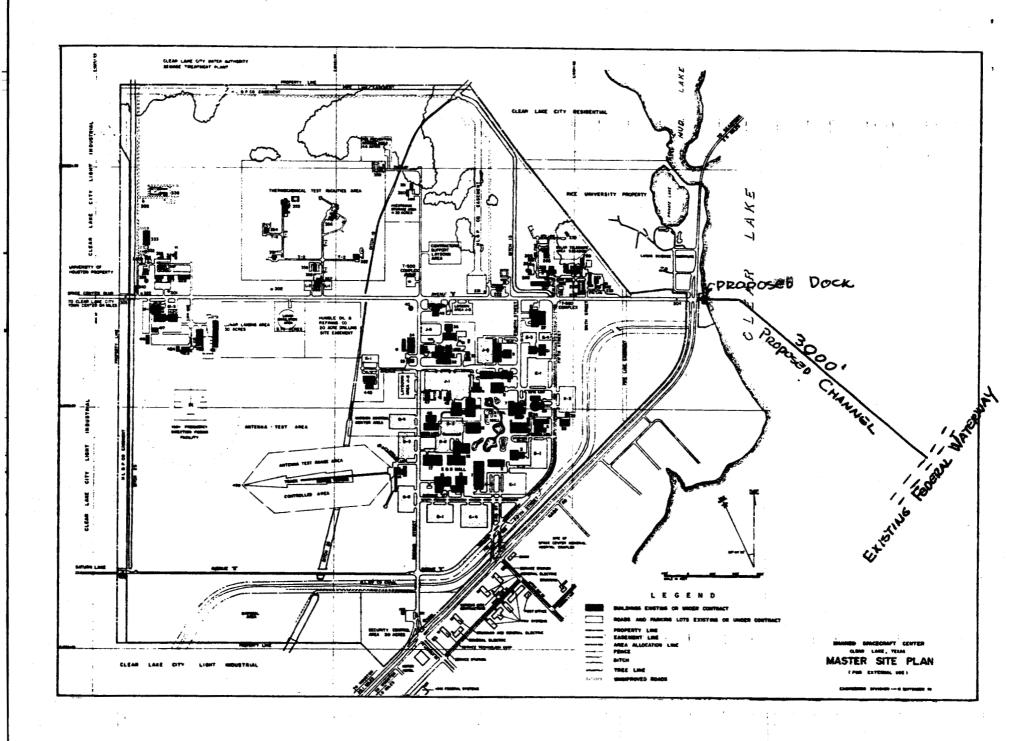
Add 1 MSC 70-117

NASA selected an over-water transportation route for the large, heavy Skylab hardware after a survey showed this to be the most practical means of shipment.

Combined water and over-land routes were also considered but were found to be impractical because of the high cost and the need to move large numbers of overhead electric, telephone and traffic light cables along the overland portion of the route.

The barge dock will be constructed of steel and concrete and will be 60 feet long. A 30-foot concrete apron will be constructed between the dock and NASA Road 1 to permit hauling test articles from the dock, across the road and through the MSC east gate on a tractor-trailer rig.

Spoil material dredged from the channel in Clear Lake will be pumped through a pipeline, under NASA Road 1 and into a relatively low 22-acre area of the MSC site north of Building 222.



NATIONAL AERONAUTICS AND SPACE ADMINISTRATION
MANNED SPACECRAFT NASA HOUSTON

483-5111

HOUSTON, TEXAS--Sigurd A. Sjoberg, Director of Flight Operations at the National Aeronautics and Space Administration's Manned Spacecraft Center, Houston, and Mrs. Sjoberg will visit Sweden October 26-30.

MSC 70-118

Sjoberg directed the MSC team which played a major role in the safe return from space of the Apollo 13 astronauts last April when their spacecraft was damaged by an explosion. Sjoberg accepted from President Nixon the Medal of Freedom on behalf of the Apollo 13 ground support team.

Of Swedish descent, Sjoberg will visit engineering societies, aeronautic facilities, and his mother's ancestral home in Tockfors.

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NATIONAL AERONAUTICS AND SPACE ADMINISTRATION MANNED SPACECRAFT CENTER NASA October 29, 1970 MSC 70-118

HOUSTON, TEXAS--Two small rockets, carrying experiments to study the infrared airglow at 50 miles altitude, will be launched for the NASA Manned Spacecraft Center from the U.S. Army White Sands Missile Range during the first two weeks of November.

turpose of the twin launches is to provide a firm basis for scientific studies of the atmosphere from either Space Station or Shuttle. Plans are being considered to conduct similar airglow experiments from Space Station or Shuttle.

The airglow is a dim luminosity produced by chemical reactions among atmospheric gases. The airglow can be seen near the horizon on clear nights and is clearly visible to astronauts in orbit who view the glowing layer edge-on.

The experiment payloads weigh about 110 pounds each and will be launched by Nike-Cajun two stage-rocket. The Nike-Cajun, a solid propellant rocket is 21 feet tall and its two stages have a total thrust of 51,000 pounds.

One of the rockets is to be launched at 4:30 p.m. to measure the daytime airglow profile, and the other is to be launched at about 2:30 a.m. to measure the night-time profile. The airglow is the brightest in the infrared part of the spectrum, where the measurements are to be made.

Add 1 MSC 70-118

Dr. Andrew E. Potter, Jr., Staff Scientist in the Space Physics Division at MSC is principal investigator for the airglow experiment. A special detachment of the U. S. Navy 'Desert Ship', located at the Army Missile Range, provides the launch facilities and launch crews for NASA.

NATIONAL AERONAUTICS AND SPACE ADMINISTRATION MANNED SPACECRAFT NASA LENGTH NASA November 4, 1970 MSC-70-120 BE 4

HOUSTON, TEXAS---When it's chow time on Skylab, astronauts who will spend four to eight weeks in Earth orbit, will have a menu which is as close to 'home-cooking' as modern food technology can make it.

Aerospace doctors and technicians are developing a food system designed to compensate partially for astronauts' long absence from the usual fare of Earthlings and the warmth and delight of home-cooked meals with family and friends.

Dr. Malcolm C. Smith, Chief of Food and Nutrition at the NASA
Manned Spacecraft Center said "For the first time, a diet will be
provided (for astronauts) which is conventional in appearance, superb in
taste and yet satisfies the most rigorous nutritional requirements. The
food system is so designed that the Skylab crews will have a relatively
wide range of selection from a set of conventional food items while still
rigidly adhering to the experimental requirements."

For the first time astronauts will prepare their meals from an assortment of frozen as well as the conventional space foods similar to that carried on manned Gemini and Apollo missions.

Astronauts will 'cook' their own meals on a special food tray now being developed for Skylab. Frozen foods will be stored in a freezer in the Skylab orbital workshop.

In addition to being the most palatable menu carried into space thus far, the Skylab food system is designed to meet the requirements and objectives of an important series of medical investigations.

Dr. Smith explained that the medical experiments are profoundly influenced by the nature and amount of food that the astronauts consume.

One of the experiments which is in the area of Nutrition and Musculoskeletal Function includes at least three different investigations which demand precise knowledge of nutrient and mineral intake.

One such investigation, Mineral Balance, depends upon the complete and accurate knowledge of everything the crew member consumes and of everything he excretes. Another investigation, Assay of Body Fluids, is also dependent upon close surveillance of certain types of nutrient intakes.

In addition to these inflight experiments there are a number of pre and post-flight medical experiments which are dependent on a detailed quantitative knowledge of what each crew member consumes throughout his exposure to orbital flight.

The Skylab food system will maintain a caloric level between 2,000 to 2,800 calories. The diet will be baselined to provide at least the minimum dietary allowances of protein, carbohydrate, fat, minerals, and vitamins which are recommended by the National Academy of Science.

More than 70 different items are now under consideration for use during Skylab missions. The final selection will be made by each crew member.

The Skylab menu will consist of the following food types:

Dehydrated - ready to eat rehydratable foods such as cream of tomato soup, scrambled eggs, salmon salad, beverages and deserts.

Intermediate Moisture - precooked, thermally stablized or fresh food with moisture content partially reduced such as dry roasted peanuts, cookies, and bacon wafers.

Wetpack - precooked, or thermally stablized food with approximately 30 to 95 percent moisture content such as turkey and gravy, meat balls with sauce and chili without beans.

Frozen - precooked, thermally stablized or fresh food stowed below minus 10°c to retard spoilage such as prime rib of beef, filet mignon, shrimp cocktail and lobster Newburg.

All food and water for the three manned Skylab missions -- one 28 day mission and two 56-day missions - will be stowed aboard the Orbital Workshop which will be launched by the Saturn V. Dr. Smith estimates approximately 2,000 lbs of food and about 6,000 lbs. of water will be required for the three manned missions.

The food tray will measure about $13\frac{1}{2}$ " X 15" by $4\frac{1}{2}$ " thick. There will be six of the trays, one for each crewmember, carried aboard the CWS when it is launched from Cape Kennedy. The tray has individual recessed compartments into which the canned food item is placed for heating.

At meal time the crew member selects his meal -- filet mignon, a vegetable, beverage and desert -- from food compartment. He places the items to be warmed in the food tray and then flips the warmer switch and presto he has a three course meal.

Add 3

Dr. Smith said "We have every expectation that the Skylab food system will provide the most palatable food that has ever been taken into space, and will at the same time support the most rigidly defined metabolic experiment ever conducted on man in space."

(Photograph # S-70-52518)

NATIONAL AERONAUTICS AND SPACE ADMINISTRATION MANNED SPACECRAFT HOUSTON

483-5111

BF4 MSC 70-121 November 20, 1970

HOUSTON, TEXAS--Ten employees of the NASA Manned Spacecraft Center in Houston have applied for a joint patent on a simple and practical device and process for recovering water and its constituent elements, hydrogen and oxygen, from lunar soil.

The device is based on a chemical process using hydrogen and solar energy to reduce oxides containing iron, which are constituents of lunar soil, to produce water vapor, which can in turn, be electrolyzed to yield oxygen and hydrogen.

Samples of lunar material returned by the Apollo 11 and 12 astronauts contain significant proportions of an iron-titanium oxide called ilmenite.

The apparatus described in the patent application uses a mirror to focus the sun's rays on a container of lunar soil, heating the soil to between 600 and 1,300 degrees Centigrade. Hydrogen is then introduced into the container and reduces oxygen atoms present in the ilmenite to form steam. The steam is passed through an electrolysis cell which separates the constituent elements of oxygen and hydrogen.

The hydrogen used in the reaction must be supplied initially from Earth, but may be recirculated a number of times to produce more oxygen.

The chemical process has been tested in a laboratory at the Manned Spacecraft Center using simulated lunar soil and has been found feasible.

Add 1 MSC 70-121

The simulated lunar soil was produced in MSC's Lunar Receiving Laboratory by grinding and mixing the proper proportions of a basalt from Hawaii and ilmenite, obtained from Canada.

The patent application notes that while neither water nor uncombined oxygen has been found on the lunar surface, both can be produced from lunar resources, offering the potential of supporting lunar exploration as well as broader space exploration. Oxygen, for example, could be used not only to support life, but also as a propellant for space vehicles.

Calculations show, with the hydrogen process, 100 pounds of lunar soil would yield nearly a pound of water; and if the iron-bearing oxides are first concentrated magnetically the yield increases to nearly 14 pounds of water from 100 pounds of lunar material.

A number of other chemical reagents are being considered in addition to hydrogen. Fluorine, for example, provides a much greater yield of oxygen, but requires a more complicated process and does not yield water directly.

The hydrogen technique and the fluorine technique for recovering oxygen from lunar soil are being investigated further at the Manned Space-craft Center and at NASA's Lewis Research Center in Cleveland.

MSC employees named as co-inventors of the hydrogen production process and related apparatus are David S. McKay, Everett K. Gibson, Patrick Butler, Jr., Norman H. Chaffee, Edward I. Chimenti, Alfred P. Sanders, Andre J. Meyer, Hoyt McBryar, T. R. Wellman, and Robin Brett.

NATIONAL AERONAUTICS AND SPACE ADMINISTRATION
MANNED SPACECRAFT
NASA

HOUSTON
MSC-Houston

HOUSTON, TEXAS---The National Aeronautics and Space Administration has selected Technicolor Inc., Hollywood, Calif., for award of a contract to provide photographic and audiovisual support services at the Manned Spacecraft Center, Houston.

Estimated value of the cost-plus-award-fee contract for one year is \$1.5 million. The contract begins Dec. 1, 1970 and contains provisions for four one-year extensions.

The new contract consolidates work presently being performed under two existing contracts and portions of three other contracts.

Six firms submitted proposals for this work.

Technicolor, Inc. will provide photographic sciences, high precision and general photographic laboratory services, film library and audiovisual services in support of the MSC Photographic Technology Laboratory.

NATIONAL AERONAUTICS AND SPACE ADMINISTRATION

MANNED SPACECRAFT
NASA

HOUSTON

November 23, 1970
MSC 70-123

HOUSTON, TEXAS--The National Aeronautics and Space Administration has awarded a one-year contract extension valued at about \$12,000,000 to Brown and Root-Northrop Corp. of Houston, a joint venture, to provide operational support services to laboratories and test facilities at the NASA Manned Spacecraft Center in Houston.

The award extends the BRN-contract through November, 1971 and contains provisions for an additional one-year renewal.

BRN has provided laboratory support services to MSC under the existing contract since December 1967.

About 700 BRN employees work at MSC, assisting in the operation of the Center's Space Environment Simulation Laboratory, Crew Systems Laboratory, Experimental Mechanical Laboratory, Lunar Receiving Laboratory, Toxicology Laboratory, and Thermochemical Test Area.

BRN also provides clinical laboratory support, assists in operation of the MSC centrifuge and aids in a wide variety of tests performed on space equipment.

NATIONAL AERONAUTICS AND SPACE ADMINISTRATION

MANNED SPACECRAFT NASA

Houston 1, Texas

483-5111

December 2, 1970 MSC 70-124 BE4

HOUSTON, TEXAS

The National Aeronautics and Space Administration has selected Service Technology Corp., Dallas, Tex., for award of a contract to provide institutional support services at the Manned Spacecraft Center, Houston.

Estimated value of the cost-plus-award-fee contract is \$14 million. The one-year contract is effective April 1, 1971, with provisions for two one-year extension periods.

STC will provide maintenance and operations, engineering and construction, technical information, supply and public affairs support services. The new contract consolidates efforts now being furnished under three separate contracts.

Eight firms submitted proposals for this work.

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MANNED SPACECRAFT NASA

483-5111

BE 4 MSC 70-126
December 8, 1970

HOUSTON, TEXAS--A 34-million-cubic-foot volume balloon will be launched by the Air Force Cambridge Research Laboratories in support of NASA's CRISP (Cosmic Ray Ionization Spectrograph Program) from Holloman AFB, New Mexico, on or about December 8, 1970.

It is the largest balloon ever built--442 feet taller than the Washington Monument--and will carry a two-ton payload to an altitude of about 108,000 feet. The CRISP balloon will provide a stable high altitude platform that will enable scientists of NASA's Manned Spacecraft Center, Houston, Texas, to measure the intensity of cosmic radiation in the upper atmosphere. This is the seventh experiment in a series designed to provide significant new scientific information about the high energy cosmic radiation and to develop future scientific experiments to be conducted in later space station missions.

CRISP 7 is a project of the Science and Applications Directorate of the NASA Manned Spacecraft Center, Houston, Texas. Air Force Cambridge Research Laboratories, headquartered at L. G. Hanscom Field, Bedford, Mass., is providing the balloon system and is responsible for the launching, operational control, and recovery of the balloon system and its scientific payload. AFCRL is an element of the Office of Aerospace Research, U. S. Air Force.

Add 1 MSC 70-126

Dr. Richard Kurz of the Science and Applications Directorate at MSC heads up the CRISP scientific team for NASA and Arthur O. Korn is AFCRL's Flight Test Director for CRISP.

The CRISP balloon and payload--which will stand 997 feet tall-- will be launched from Holloman Air Force Base, New Mexico, and prevailing winds are scheduled to carry the drifting balloon and gondola eastward on a course across several southern states at a 20-mile high altitude.

It is scheduled for lift-off at approximately 11:00 p.m. MST (10:00 p.m. CST). It will require $2\frac{1}{2}$ hours for the payload to reach design altitude of 108,000 feet where prevailing winds will move the package eastward for approximately 12 hours. Recovery is scheduled for 12 noon CST the following day.

The exact recovery location depends on the speed of the prevailing winds.

The mammoth balloon is a two-part interconnected system with main balloon surmounted by a smaller launch balloon. Both balloons are made of mylar scrim.

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NATIONAL AERONAUTICS AND SPACE ADMINISTRATION

NATIONAL AERONAUTICS AND SPACE ADMINISTRATION

MANNED SPACECRAFT

NASA

Houston 1, Texas

December 10, 1970

483-5111

HOUSTON, TEXAS--The NASA Manned Spacecraft Center has modified its space shuttle study contract with Space Division, North American Rockwell, Downey, California to include a structural test program.

Estimated value of the fixed price modification is \$2 million.

Total value of the contract is estimated at \$10.8 million. This includes \$8 million for definition and preliminary design studies; a \$500 thousand add-on to study use of expendable second stages, and a \$300 thousand increment of Department of Defense funds to study requirements for the U.S. Air Force.

The contractor has been requested to establish a test program on cryogenic tank structure and insulation; high-temperature fasteners; static and dynamic seals; bulk insulation packaging and attachment; thermal protection; wing structure and fuselage structure. Work will be done at plants in Downey and Seal Beach, California and at a subcontractor facility in San Diego.

North American Rockwell is one of two aerospace firms making detailed studies of the space shuttle transportation system. A similar study by McDonnell-Douglas Corporation, St. Louis, Missouri is monitored by the Marshall Space Flight Center.

NATIONAL AERONAUTICS AND SPACE ADMINISTRATION MANNED SPACECRAFT CENTER 1. Texas December 11, 1970 MSC 70-/27

HOUSTON, TEXAS--More than 100 employees of the NASA Manned Space-craft Center will be recognized in an award ceremony, December 14 for their contributions to the Apollo 13 mission and the safe return of the astronauts following the explosion and loss of oxygen and electrical supplies aboard the spacecraft.

Apollo 13 astronauts Fred W. Haise, Jr., and John L. Swigert, Jr. will receive the NASA Distinguished Service Medals awarded them and Apollo 13 Commander James A. Lovell, Jr. at NASA Awards Ceremonies in Washington last month.

Ten persons will receive awards for contributions to last year's successful Apollo 12 mission.

MSC Associate Director Frank A. Bogart will be master of ceremonies and Deputy Director Christopher C. Kraft, Jr. will make the presentations to MSC employees of 47 Certificates of Commendation, and 73 Certificates of Superior Achievement. Ten Certificates of Appreciation will be awarded to officials of contractor firms. One Group Achievement Award will be made.

The awards ceremony will be held in the MSC Auditorium, Building 1, beginning at 3 P.M. Monday.

(See attached list of award recipients)

EMPLOYEES NOMINATED FOR AWARDS

NASA Distinguished Service Medal (Apollo 13)

Fred W. Haise, Jr. John L. Swigert, Jr.

MSC Certificate of Commendation (Apollo 12)

*Maj. Charles J. Tringali

Mission Planning and Analysis Division Emil R. Schiesser

Flight Support Division James C. Stokes, Jr.

Lunar Missions Office
John G. Zarcaro

MSC Certificate of Commendation (Apollo 13)

Public Affairs Office Brian M. Duff

Flight Control Division

Arnold D. Aldrich

Melvin F. Brooks

Gerald D. Griffin

James E. Hannigan

Eugene F. Kranz

Glynn S. Lunney

Jones W. Roach

Milton L. Windler

Astronaut Office

Vance D. Brand

Maj. Charles M. Duke, Jr.

Lt. Comdr. Joseph P. Kerwin

Maj. Jack R. Lousma

Lt. Comdr. Thomas K. Mattingly

Comdr. John W. Young

Col. Thomas P. Stafford.

Mission Planning & Analysis Division

Ronald L. Berry

Carl R. Huss

Flight Crew Support Division

Stanley Faber

Tommy W. Holloway

Riley D. McCafferty

John W. O'Neill

^{*}Presently assigned to AF - Space & Missiles System Organization, Los Angeles, California.

MSC Certificate of Commendation (Apollo 13) CONTINUED Apollo Spacecraft Program Office

Aaron Cohen

Ronald W. Kubicki

James A. McDivitt

Scott H. Simpkinson

Owen G. Morris

Engineering & Development Directorate

Robert P. Burt

Philip M. Deans

John B. Lee

Systems Engineering Division

John R. Sevier, Jr.

Information Systems Division

Arturo B. Campos

Test Division

Sidney C. Jones, Jr.

Donald D. Arabian

Crew Systems Division

Robert E. Smylie

Guidance and Control Division

John F. Hanaway

Propulsion & Power Division

Richard B. Ferguson

Flight Operations Directorate

Sigurd A. Sjoberg

Howard W. Tindall, Jr.

Goddard Space Flight Center

Richard J. Augenstein

Dale W. Call

George A. Cassels

William A. Pfeiffer

Robert H. Plaumann

Robert L. Owen

Robert E. Spearing

Robert C. Taylor

MSC Superior Achievement Award (Apollo 12)

IM Project Engineering Division

William C. Fischer

Daniel T. Lockard

MSC Superior Achievement Award (Apollo 12) CONTINUED CSM Project Engineering Division Jerry S. Lowe

Gary G. Metz

MSC Superior Achievement Award (Apollo 13)

Astronaut Office

Capt. Eugene A. Cernan Dr. Anthony W. England Lt. Col. Joe H. Engle Comdr. Ronald E. Evans Comdr. Edgar D. Mitchell Lt. Col. William R. Pogue Maj. Stuart A. Roosa Maj. Harrison H. Schmitt Col. David R. Scott

Flight Control Division

John W. Aaron William C. Burton Charles F. Deiterich Harold M. Draughon Charles L. Dumis Edward I. Fendell William E. Fenner Neil B. Hutchinson Robert H. Heselmeyer Larry W. Keyser Jack Knight, Jr. Seymour A. Liebergot Harold A. Loden W. Merlin Merritt, Jr. William L. Peters Donald R. Puddy H. David Reed Kenneth W. Russell William M. Stoval, Jr. Larry W. Strimple Richard A. Thorson John A. Wegener Briggs N. Willoughby

Information Systems Division Gary W. Johnson

Crew Systems Division James V. Correale Edward L. Hays Elton M. Tucker

Guidance and Control Division Cline W. Frasier

Propulsion & Power Division Bobby J. Bragg William R. Hammock, Jr.

Structures & Mechanics Division James A. Smith, Jr.

Landing and Recovery Division Sheridan J. Berthiaume Richard W. Blakley Edward C. Bullock Charles C. Filley John E. Hoover

Mission Planning & Analysis Division

Martin L. Alexander Troy J. Blucker Robert S. Davis *Charles A. Denham Rocky D. Duncan Quentin A. Holmes Martin D. Jenness Alfred N. Lunde Robert E. McAdams Charles W. Pace Vernon S. Ritchey Robert T. Savely Walter Scott, Jr. Richard M. Swalin Kenneth T. Zeiler

Systems Engineering Division Richard H. Kohrs

LM Project Engineering Division Donald M. Corcoran John G. Presnell, Jr. John Vincze

Flight Support Division James E. Mager

*Is presently at Ent AF Base, Colorado, 14th Aerospace Force

MSC Superior Achievement Award (Apollo 13) Continued

CSM Project Engineering Division

Robert E. Bobola Jerry S. Lowe Daniel A. Nebrig William H. Taylor, Jr.

MSC Certificate of Appreciation (Apollo 12)

Robert E. Breeding, Hamilton Standard Leonard F. Shepard, International Latex Corporation

MSC Certificate of Appreciation (Apollo 13)

Willard R. Bischoff, Grumman Aerospace Corporation Joseph G. Gavin, Jr., Grumman Aerospace Corporation George W. Jeffs, North American Rockwell Corporation Donald J. Markarian, Grumman Aerospace Corporation George B. Merrick, North American Rockwell Corporation Gray E. Smith, Grumman Aerospace Corporation Ralph H. Tripp, Grumman Aerospace Corporation

MSC Certificate of Appreciation (Awarded 11/70)

North American Rockwell Corporation, Tulsa Division Carl A. Hawthorne

MSC Group Achievement Award (Apollo 13)

Public Affairs Office

NATIONAL AERONAUTICS AND SPACE ADMINISTRATION
MANNED SPACECRAFT
NASA

CENTER

NASA

1, Toxas

483-5111

December 16, 1970 MSC-70-131 BEH

HOUSTON, TEXAS---- NASA today rescheduled the launch of a balloon borne scientific instrument package for no earlier than January 15, 1971.

Poor weather conditions both in the launch area (Holloman Air Force Buse, New Mexico) and in the proposed recovery area (eastern seaboard) forced cancellation of the scheduled launch late Tuesday night. Dr. Richard Kurz, manager of the Cosmic Ray Ionization Spectrograph Program CRISP, said the new launch window for the six-ton payload is now January 15 through February 21, 1971.

The balloon borne payload, designed to study the cosmic rays in the upper atmosphere, is scheduled to rise to an altitude of 108,000 feet and drift east. The program is managed by the NASA Manned Spacecraft Center and is launched by the US Air Force Cambridge Research Laboratories.

This is the seventh in the series of CRISP flights.

NATIONAL AERONAUTICS AND SPACE ADMINISTRATION MANNED SPACECRAFT CENTER 483-5111 January 15, 1971

HOUSTON, TEXAS...While the majority of activity at NASA's Manned Spacecraft Center is directed toward the upcoming moon landing of Apollo 14, a group of astronauts and technicians are learning all they can about the sun.

MSC-71-01

The astronauts, potential Skylab crew members, about 50 support personnel at MSC are taking a special course in solar physics. The curriculum of the graduate level course includes a discussion of solar terrestial effects, problems to be resolved in solar physics and observational characteristics of a variety of solar phenomena.

The purpose of the course is to provide the potential Skylab crewmen with a background in solar physics and observing which will enable them to efficiently operate the Apollo Telescope Mount, one of the primary scientific objectives scheduled for Skylab. The astronauts are being trained to be solar observers with an intuitive feel for the physics behind the solar phenomena.

There are a number of transient events on the sun which emit radiation in the X-ray, ultraviolet and infrared wave lengths which can only be observed from above the earth's atmosphere. The Skylab manned telescope provides the capability of recording these events in high spatial and spectral resolution in the ultraviolet, X-ray, white light and hydrogenalpha bands. The transient events are particularly prominent in and around active regions on the solar disk (or in the corona).

Of the astronaut's role in the ATM, Scientist Astronaut Owen K. Garriott said, "the crewmen will provide the desired flexibility and reliability in selecting targets of scientific interest and pointing of the ATM."

"The solar physics course," Dr. Garriott said, "provides the crewmen with the background and training in recognizing, understanding, and responding to solar phenomena and events required to operate the ATM in an efficient manner."

The astronauts and support personnel have completed half of the 60-hour course started Oct. 19, 1970. When the classroom portion of the course is completed, sometime in late January, the astronauts are scheduled to gain real-time experience in use of solar telescopes and associated equipment at Sacramento Peak Observatory, Lockheed Solar Observatory, Aerospace Observatory, Kitt Peak National Observatory, and the High Altitude Observatory.

Dr. Frank Orrall of the University of Hawaii is the senior lecturer for the course. Dr. Orrall, who is on leave from the Department of Physics and Astronomy, will give a total of 38 hours of lectures on various topics in solar physics generally covering the entire field.

Other course lecturers are Dr. G. Richard White, senior scientist at the High Altitude Observatory (HAO), Boulder, Colo., Dr. R. Grant Athay, senior scientist HAO, Professor Adjoint in the Department of Physics and Astrophysics, University of Colorado, and Dr. John A. Eddy, senior scientist HAO, Professor in Astro-Geophysics Department of the University of Colorado.

The lectures are being video taped separately and will be available to other NASA personnel as well as principal investigators for the ATM experiments. Monthly update sessions will be held for the astronauts to review past solar activity, to discuss future trends, and review or obtain additional information on solar observation.

Add 2 MSC 71-01

The course is divided into extensive reviews of the introduction to solar phenomena, the quiet sun (study of the solar interior, photosphere, chromosphere, and the corona), the active sun (sun spots, plages, prominences, active corona), and flares and explosive phenomena.

As part of the course, students study the sun in real time by means of closed circuit television. The TV picture is piped in from MSC's solar telescope, located about a half mile from the classroom.

MANNED SPACE CRAFT NASA HOUSTON

483-5111

January 21, 1971 MSC 71-02

HOUSTON, TEXAS...Two members of NASA have been invited to participate in the initial meetings of a study group planning a proposed Texas Textite Program, an underwater living project which might be established in the Flower Garden coral reef of the Gulf of Mexico.

James L. Tomberlin, a special assistant in MSC's Engineering and Development Directorate, and Richard Sprince, from the Office of Manned Spaceflight, NASA Headquarters, have represented the space agency, during the exploratory meetings.

The Texas Tektite feasibility meetings is sponsored by the Marine.

Biomedical Institute of Galveston. It is a joint project of the University of Texas and Texas A&M University systems.

Initial meetings investigated use and benefits which might come from such a project. Attending were representatives from other governmental agencies, industry and academic institutions.

NATIONAL AERONAUTICS AND SPACE ADMINISTRATION MANNED SPACECRAFT

483-5111

January 25, 1971 MSC 71-03

HOUSTON, TEXAS--A five-man board was named today by Manned Space-craft Center Director Robert R. Gilruth to investigate the crash Jan.

23 of a NASA helicopter piloted by Astronaut Eugene A. Cernan.

Astronaut James A. Lovell, Jr., will be board chairman. Other members of the investigating team will be Conway H. Roberts, Aviation Safety Officer at MSC; Harold E. Ream, Senior MSC Pilot; Dick M. Lucas, Chief of MSC's Aircraft Maintenance and Quality Assurance Branch; and Astronaut Alan L. Bean.

Astronaut Cernan was flying the helicopter, a two-place Bell 47, on a training flight when the craft crashed in the Indian River near Cape Kennedy.

Cernan, who is Commander of the Apollo 14 backup crew, escaped from the crash with minor contusions and abrasions and some slight singeing of the eyebrows and eyelids.

NATIONAL AERONAUTICS AND SPACE ADMINISTRATION MANNED SPACECRAFT NASA HOUSTON

483-5111

January 29, 1970 MSC 71-04 BE4

Houston, Texas--Stuart M. Present, a MSC staff pilot, ejected today from a lunar landing training vehicle at Ellington Air Force Base, Texas.

He was not injured. Details of the accident, which occurred at 10:34 a.m.,

CST, are not yet available. They will be released as soon as possible.

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NATIONAL AERONAUTICS AND SPACE ADMINISTRATION MANNED SPACECRAFT NASA HOUSTON January 29, 1971 MSC 71-05 January 29, 1971 MSC 71-05 JEFU

HOUSTON, TEXAS--Stuart M. Present, 40, a MSC staff pilot, ejected today from a lunar landing training vehicle at Ellington Air Force Base, Texas. He was not injured.

power was the cause of the crash. Up to the time electrical power was lost, the attitude control system and the lunar module hand controller appeared to be functioning normally.

Christopher C. Kraft, Jr., MSC Deputy Director, said, "A complete investigation will be made of the accident. This accident should not affect Apollo 14. The only piece of hardware common to the LM and the LLTV is the hand controller, and that does not appear to have been the problem. The LLTV electrical system is totally different from the one in the lunar module."

Present was on a routine check flight when the accident occurred at 10:35 a.m., CST. He ejected moments before the vehicle crashed on a runway and burned. He had made 28 previous LLTV flights, beginning in April, 1970.

Add 1 MSC 71-05

Three LLTV's were contracted for from Bell Aerosystems

Company, Buffalo, New York, and delivered at a cost of \$5.6

million in the latter part of 1967.

Today's crash was the second for a LLTV. The one remaining LLTV is based at Ellington AFB.

The first LLTV was destroyed in a crash December 8, 1968, at Ellington. The pilot, Joseph S. Algranti, Chief of MSC Aircraft Operations, parachuted to safety.

A Lunar Landing Research vehicle, forerunner to the LLTV, crashed at Ellington, May 6, 1968. The pilot, Astronaut Neil Armstrong, ejected safely.

The single-seat, wingless, free-flying vehicles are used to simulate the final 500 feet of the lunar landing. Primary support for the vehicle is supplied by a 4,200 pound thrust turbofan engine which has been modified for vertical flight and installed on a gimball mounting behind the cockpit.

The engine is automatically controlled and lifts fivesixths of the vehicles's weight, thus counteracting fivesixths of the earth's gravity and simulating the one-sixth gravity of the moon.

Lift for the remaining one-sixth of LLTV's weight is provided by two rocket engines with a maximum thrust of 500 pounds each.

MANNED SPACECRAFT NASA HOUSTON

483-5111

February 8, 1971 71-06

HOUSTON, TEXAS...The Manned Spacecraft Center announced today a reorganization of Center Administrative, procurement, and technical support activities.

The Administration Directorate and the Program Control and Contracts
Directorate have been abolished. The Procurement Division and Program
Budget Division formerly assigned to the Program Control and Contracts
Directorate, together with the Institutional Resources and Procurement
Division, the Personnel Division, the Financial Management Division, the
Management Analysis Office, and university programs responsibility have been
organized into a new Administration and Program Support Directorate. The
Photographic Technology Division, Engineering Division, Technical Services
Division, Logistics Division, and Management Services Division formerly a
part of the Administration Directorate will form a new Center Operations
Directorate.

Mr. Philip H. Whitbeck, formerly Director of Administration, was named as Director of the Administration and Program Support Directorate.

Mr. Clinton L. Taylor, formerly Assistant Manager of the Skylab Program

Office, was named Deputy Director of the new Directorate. Mr. Joseph V.

Piland, formerly Deputy Director of Administration, was named as Director of the Center Operations Directorate.

Mr. Whitbeck, a native of Stillwater, Minnesota, has been with NASA since shortly after its establishment. He joined the Manned

Spacecraft Center in March of 1961 serving as Deputy Director of Administration until 1968 when he became Director of Administration. Mr. Whitbeck is a graduate of the University of Minnesota where he received his undergraduate degree in Political Science in 1947 and completed graduate work in Public Administration in 1948. Prior to his service with NASA, Whitbeck served with the Atomic Energy Commission as a senior management analyst and a Personnel Officer. Whitbeck is married to the former Elizabeth Read of Rahway, New Jersey. The Whitbecks have two children: Bill, 14, and Anne, 16, both students at LaPorte High School. The Whitbecks reside in Shoreacres, Texas.

Mr. Taylor, a native of Austin, Texas has been with NASA since 1962 when he joined the Manned Spacecraft Center. Prior to 1962, he was with General Dynamics - Convair and North American Rockwell in an engineering capacity. Mr. Taylor is a graduate of the University of Texas at Austin where he received his degree in Mechanical Engineering in 1961. He is married to the former Marion Nowotny of Austin, Texas. The Taylors have sneighble, Cynthia Lynn, 9 years old. The Taylors reside in Houston.

Mr. Piland, a native of Portsmouth, Virginia, has been with NASA.

Since its establishment and prior to that with its predecessor agency,

The National Advisory Committee on Aeronautics. From 1964 to 1969 he

served as Manager of Technical and Engineering Services and in 1969 he

was appointed Deputy Director of Administration. Mr. Piland is a graduate

of Virginia Polytechnic Institute where he received his degree in Mechanical Engineering. He is married to the former Ruth Beard of Portsmouth, Virginia. The Pilands have three children: Ellen, 22; Joseph Jr., 21; and John, 15. The Piland's reside in Dickinson, Texas.

NATIONAL AERONAUTICS AND SPACE ADMINISTRATION
MANNED SPACECRAFT NASA Houston

483-5111

February 17, 1971 MSC 71-07

add?

BE4

HOUSTON, TEXAS... The National Aeronautics and Space Administration has awarded Lockheed Electronics Company of Houston a contract to provide scientific and technical support services for the Earth Resources Laboratory located at the Mississippi Test Facility, Bay Saint Louis, Mississippi.

The cost-plus-fixed fee contract will have an estimated value of approximately \$800,000 for the first year's performance which is scheduled to commence in February 1971. The contract calls for 55 support personnel to be employed during the first year.

Lockheed will support the Earth Resources Laboratory in conducting research investigations in the Mississippi-Louisiana-Gulf area in the application of remotely sensed data obtained with aircraft and satellites.

NATIONAL AERONAUTICS AND SPACE ADMINISTRATION MANNED SPACECRAFT LETTER 453-5111 ASS. 71-08 07 1/1

HOUSTON, TEXAS...NASA Acting Administrator George M. Low will present awards Saturday, February 28 to NASA employees and to contractors and Department of Defense organizations for outstanding contributions to the Apollo 13 and 14 missions.

Apollo 14 astronauts Alan B. Shepard., Stuart A. Roosa and Edgar D. Mitchell and Apollo 13 Astronauts James A. Lovell, Jr., and Fred W. Haise will participate in the ceremonies, which will be held at the Manned Spacecraft Center in the main auditorium of building 1 begining at 10 a.m.

MSC Deputy Director Christopher C. Kraft, Jr., will be master of ceremonies and will assist in presentation of the awards.

Six NASA officials will receive the Agency's highest award, the NASA Distinguished Service Medal. Recipients of the award will be Dale D. Myers, Associate Administrator for Manned Space Flight, NASA Headquarters; James A. McDivitt, Manager, Apollo Spacecraft Program Office, Manned Spacecraft Center; Sigurd A. Sjoberg, Director of Flight Operations, Manned Spacecraft Center; Walter J. Kapryan, Director of Launch Operations, Kennedy Space Center; Eugene F. Kranz, Chief, Flight Control Division, Manned Spacecraft Center; and Glynn S. Lunney, Chief, Flight Directors Office, Manned Spacecraft Center.

The NASA Distinguished Public Service Medal will be awarded to the Grumman Aerospace Corporation "In recognition of the team's outstanding skill which made possible the successful use of the Lunar Module as a rescue vehicle for the safe return to earth of the Apollo 13 crew."

The award will be accepted by Grumman Senior Vice President Joseph G. Gavin, Jr.

Twenty three NASA employees will receive NASA Exceptional Service

Medals in recognition of "their outstanding contributions to this nation's
manned space flight program."

NASA Group Achievement Awards will be presented to the Manned Flight support Network of NASA's Goddard Space Flight Center and to the Department of Defense Recovery Forces.

Donald E. Eyles, an employee of the Charles Stark Draper Laboratory at the Massachussetts Institute of Technology, will receive the NASA Public Service Award for his contribution in solving a problem with the Apollo 14 Lunar Module guidance system and circumventing an inadvertent abort of the lunar landing.

NASA DISTINGUISHED SERVICE MEDALS

Walter J. Kapryan Eugene F. Kranz Glynn S. Lunney James A. McDivitt Dale D. Myers Sigurd A. Sjoberg

Kennedy Space Center
Manned Spacecraft Center
Manned Spacecraft Center
Manned Spacecraft Center
NASA Headquarters
Manned Spacecraft Center

NASA DISTINGUISHED PUBLIC SERVICE MEDAL

Grumman Aerospace Corporation

NASA EXCEPTIONAL SERVICE MEDALS

Arnold D. Aldrich Donald D. Arabian Ronald L. Berry Graydon F. Corn M. P. Frank. III John R. Garman Charles D. Gay James E. Hannigan Onice M. Hardige, Jr. Caldwell C. Johnson, Jr. Sidney C. Jones, Jr. H. Fletcher Kurtz, Jr. Ellery B. May, Jr. Riley D. McCafferty Charles H. Meyers Lawrence B. Mulloy Shelby L. Owens John W. O'Neill Scott H. Simpkinson Richard A. Thorson Terry Williams Milton L. Windler Ralph A. Yoria

Manned Spacecraft Center Manned Spacecraft Center Manned Spacecraft Center Kennedy Space Center Manned Spacecraft Center Manned Spacecraft Center Kennedy Space Center Manned Spacecraft Center Marshall Space Flight Center Manned Spacecraft Center Manned Spacecraft Center Marshall Space Flight Center Marshall Space Flight Center Manned Spacecraft Center Marshall Space Flight Center Marshall Space Flight Center Manned Spacecraft Center Manned Spacecraft Center Manned Spacecraft Center Manned Spacecraft Center Kennedy Space Center Manned Spacecraft Center Kennedy Space Center

NASA PUBLIC SERVICE AWARD

Massachusetts Institute of Technology

NASA GROUP ACHIEVEMENT AWARDS

Manned Flight Support Network, Goddard Space Flight Center
DOD Recovery Forces

NATIONAL AERONAUTICS AND SPACE ADMINISTRATION MANNED SPACECRAFT CENTER Wash March 3, 1971 MSC 71-09

HOUSTON, TEXAS--The National Aeronautics and Space Administration today announced prime and backup crews for the Apollo 16 mission, scheduled for launch in March 1972.

Prime crewmen are John W. Young, Commander; Thomas K. Mattingly II, Command Module Pilot; and Charles M. Duke, Jr., Lunar Module Pilot. Backup crewmen, respectively are Fred W. Haise, Jr., Stuart A. Roosa, and Edgar D. Mitchell.

The lunar landing site for Apollo 16 has not yet been selected; however, it will not be in a mare area.

Mission duration will be approximately 12 days, including a lunar surface stay time of about 67 hours. Young and Duke will have three extravehicular activity periods on the lunar surface, totaling about 20 hours. They will use a Lunar Roving Vehicle (LRV).

An Apollo lunar surface experiment package (ALSEP) will be deployed and an extensive lunar orbital science program will be conducted. Mattingly will leave the Command Module during trans-earth coast to retrieve a lunar orbital science film package from the service module.

Young, 40, is a Navy Captain who will be making his fourth space flight. He has flown on Geminis 3 and 10 and Apollo 10. Apollo 16 will be his first lunar landing mission.

Mattingly, 34, a Navy Lieutenant Commander, has not yet flown in space. He was replaced as the prime command module pilot on Apollo 13 a few days before launch after being exposed to the German measles.

Add 1 MSC 71-09

Duke, 35, an Air Force Lieutenant Colonel, also will be making his first space flight. He was backup lunar module pilot for Apollo 13.

Haise, 37, a civilian, was the lunar module pilot on the Apollo 13 mission. He served as backup lunar module pilot for Apollos 8 and 11.

Roosa, 37, is an Air Force Lieutenant Colonel. He was the command module pilot on the recently completed Apollo 14 mission.

Mitchell, 40, a Navy Captain, was the lunar module pilot on Apollo 14. He served as backup lunar module pilot on Apollo 10.

NATIONAL AERONAUTICS AND SPACE ADMINISTRATION NED SPACECRAFT NASA HOUSTON 1. To X 8 8 483-5111 March 17, 1971

HOUSTON, TEXAS -- Representatives of the Earth Observations Division at the NASA Manned Spacecraft Center, Houston, Texas will discuss potential use of remote sensing techniques on March 23, 1971 in Dallas.

MSC 71-10

Mike Holter, Dr. John Dornbach, and Bryan Erb of NASA's Earth
Observation Division will describe what NASA has accomplished in the
earth observation area. NASA-MSC has several instrumented aircraft
which overfly select test sites for government and university scientists
in the disciplines of agriculture, forestry, geology, hydrology and
oceanography.

Mr. Holter will discuss the work being planned in the Houston area and this work's potential application to the Dallas region.

Representatives of regional planning and local public agencies have been invited to attend the presentation which will be held in the auditorium of the Dallas Power and Light Company at Commerce and Browder Streets. The program, which is sponsored by the Dallas Area Office of the Housing and Urban Development, begins at 9:30 a.m. on March 23.

NATIONAL AERONAUTICS AND SPACE ADMINISTRATION
WANNED SPACECRAFT NASA

CENTER NASA

483-5111

March 24, 1971
MSC 71-11

HOUSTON, TEXAS -- A new "quick and easy" rice preparation process which was developed for the nation's manned space flight program may soon find its way to the American dinner table or on camping and hunting trips.

NASA's Invention and Contributions board which has described the process as a "technical contribution having scientific value" awarded \$300 to its inventor Dr. Clayton Huber of the NASA Manned Spacecraft Center's team of food scientists. Dr. Huber is employed by Technology, Inc. of San Antonio, Texas, which provides design and evaluation of space flight feeding systems at MSC.

The new process allows rice using "hot tap water" to rehydrate from the dry state to the "ready-to-eat" in several minutes, compatible to use in a spacecraft and the common household kitchen. The process modifies the physical properties of the rice starch by means of alternate cycles of freezing (2 hours at minus 14°F) and thawing and a final treatment of freeze-drying making it more readily digestible and easy to prepare.

An advantage of the process, according to its inventor Dr. Huber, is that it requires no boiling water or extended steaming. In the space-craft, the water used to prepare food is about 155°F, Huber explained, and water from the hot faucet in the kitchen is about 155°F.

In addition to not requiring "boiling water", the "space-rice" is ready to eat in just a matter of minutes. In recent lab tests a special portion of lab-prepared chicken and rice soup, mixed with hot tap water was ready to eat in less than four minutes.

Dr. Norman D. Heidelbaugh, Chief of Food Science Services off the Preventive Medicine Division at MSC said the Aerospace Food Technologist, and the housewife have similar problems. "Each is continually searching for food which is safe, nutritious, economical, and convenient to prepare and serve."

Heidelbaugh said the new rice process "falls into these categories -its safe, nutritious, economical, and convenient to prepare.

Dr. Heidelbaugh reports that two major food companies have shown interest in this new rice process and it's possible that the process may find its way to the commercial market. The new processed rice would not only help the housewife, Dr. Heidelbaugh said, but it would be great for hunters and campers who want a quick and nutritious food item.

The Apollo 14 crew which completed a successful landing on the moon carried along some of the rice prepared by the new process. A chicken and rice soup, prepared in the Food and Nutrition laboratories at MSC, was eaten by the Apollo 14 astronauts Alan B. Shepard, Edgar Mitchell and Stuart Roosa.

"The rating from the crew was very good," Dr. Huber reported.

Huber and his team of food technologists are not stopping with chicken and rice soup. Research is currently under way to combine rice with other products such as shrimp, and ham, he stated.

The MSC research team, supported by Dr. Huber's team of food technologists from Technology, Inc., is conducting research in other areas of food science and nutrition. This includes work in instant fruit drinks, nutritional food sticks, nutritionally complete milk-based beverages, and freeze dehydrated foods.

Dr. Huber, 33, is a native of LaPoint, Utah and is a graduate of.

Utah State University where he received a B.S. and M.S. in Dairy

Science. He received his Ph.D. in Food Science from Purdue. He is

married to the former Beth Briggs of Syracuse, Utah and they have three children.

SPACE ADMINISTRATION Houston 483-5111

MSC 71-12

HOMETOWN RELEASE

Houston, Texas -- Richard A. Wright formerly of San Antonio, Texas, has been appointed Executive Assistant to the Director of Science and Applications at the NASA Manned Spacecraft Center in Houston.

Anthony J. Calio, Director of Science and Applications, said Mr. Wright, formerly a civilian employee at Kelly Air Force Base in San Antonio, will assume his post immediately.

The Science and Applications Directorate at the Manned Spacecraft Center is responsible for developing scientific experiments for the Apollo lunar landing program and for the follow-on Skylab earth orbital program. The organization is also responsible for conducting the preliminary examination of the returned lunar samples and for distributing samples to the world-wide scientific community for detailed investigation. In addition, the Science Directorate manages programs for surveying earth resources from space. It develops and tests techniques which may be used in space to assess the health and status of crops, rangeland and forests; to locate mineral reserves and productive fishing grounds; to survey air and water pollution; and to improve geological and geographical mapping. The organization also conducts basic research in geology, geophysics, space radiation, astronomy, geochemistry and highenergy physics; and it provides science training for astronaut crews.

In his position as Executive Assistant, Mr. Wright will assist the Director of Science and Applications in management and administrative activities.

Mr. Wright has been with NASA since 1963 and has 21 years of Government Civil Service. Prior to his present appointment he was assistant to the Chief of the Planetary and Earth Sciences Division at the Manned Spacecraft Center.

Mr. Wright is the son of the late C. Burton Wright and of Lydia.

K. Wright, who resides in San Antonio. He is married to the former

Betty Jean Bess of Cherryville, North Carolina. They have two children,

Deborah S., 13 and Ricky A., 11.

NATIONAL AERONAUTICS AND SPACE ADMINISTRATION
MANNED SPACECRAFT NASA

Leading to the second space administration of the s

MSC 71-12

HOUSTON, TEXAS---A retraining program for qualifying engineers to work in critical areas has been formed at the NASA Manned Spacecraft Center here. The program is aimed toward strengthening the Center's engineering capability in the thermal analysis and materials technology fields.

The Structures and Mechanics Division of the MSC Engineering and Development Directorate hopes to fill 18 engineer positions--12 in thermal analysis and six in materials specialties -- from within the ranks of engineers in the Directorate. New hiring of engineers is sharply curtailed under present NASA personnel ceilings.

The retraining in the two technical specialties will be done through intensive refresher courses conducted by university engineering. faculty, MSC staff and by on-the-job training at the Center. The program is scheduled to begin by the end of March.

Engineers applying for retraining in thermal analysis should have degrees and experience in math analysis, thermodynamics, heat transfer or systems engineering. A degree and experience in mechanical, civil, industrial, chemical or metallurgical engineering is required for retraining in the materials technology specialty.



483-5111

March 26, 1971 MSC 71-14

HOUSTON, TEXAS--A twenty-three man team of scientists has nearly completed preliminary examination of 94 pounds (42.64 kilograms) of lunar material from the Apollo 14 mission, including 63 pounds (28.5 kilograms) of rocks described as the most complicated yet returned from the moon.

Dr. Robin Brett, Chief of the Geochemistry Branch at NASA's

Manned Spacecraft Center and Vice Chairman of the Lunar Sample Preliminary Examination Team, said the complexity of the rocks arises
from the large number of minerals they contain, from their fragmental
makeup, and from the numerous and often superimposed geologic histories
they reflect.

The Apollo 14 rocks contain some 23 different minerals -- as many as were found in the Apollo 11 and 12 samples combined -- and only about half of these minerals have as yet been positively identified.

frequently composed of several different rock types; and they often contain large numbers of fragmental clusters or breccias which in turn are composed of smaller clusters which are themselves made up of still smaller fragmental clusters. Each of the superimposed groups of breccias may represent a different phase of the rock's history. Some of these fragments may date back to the original 4.6 billion year old crust of the moon.

Dr. Brett said it should not be surprising that the Apollo 14 material shows a complex and varied history. The site at Fra Mauro was selected, he said, because it offered an excellent change to recover material that may have formed part of the ancient lunar crust and subsurface material before it was scattered over a large area of the moon's surface by the impact of the meteorite or asteroid which formed the Imbrium basin early in the moon's history.

Our experience with large meteorite impacts and volcanic explosions on earth, said Dr. Brett, would lead us to expect the kinds of complicated fragmental rocks we have in such abundance in the Apollo 14 sample.

Although it is not possible from a preliminary examination to say conclusively that Imbrium crustal material was returned from the landing site at Fra Mauro, Dr. Brett said initial chemistry data shows the sample to be enriched in some of the same elements that formed earth's crust. They are elements, he said, which do not fit easily into most minerals, so if melting of a rock occurs these elements tend to separate out first, forming a scum which on earth cooled to form the planet's crust.

In comparing the Apollo 14 rocks with rocks returned from the Apollo 11 and Apollo 12 missions, the material from previous missions that is closest in chemical composition to many of the Apollo 14 rocks is the norite or "KREEP" component of rock 13 and others from the Apollo 12 sample.

The Apollo 14 rocks also possess how concentrations of solar wind implanted particles compared with similar rocks from the Apollo 11 and 12 sites. This implies either that the Apollo 14 fragmental rocks were formed in a different manner or that they had a different post-formational history from fragmental rocks returned previously from the mare regions of the moon.

The Apollo 14 sample contains far fewer igneous rocks than either the Apollo 11 or the Apollo 12 sample. Whereas large portions of the Apollo 11 and 12 rocks were igneous, only two of the rocks 50 grams (1.75 or) or larger returned on the Apollo 14 mission are igneous, and only one of these is chemically similar to the basalts of either Apollo 11 or 12.

Nearly all the Apollo 14 rocks are composed of various sizes and types of fragments bound together with differing degrees of cohesion. At one extreme these fragmental rocks are little more than loosely cohering clods resembling clumps of dirt in a freshly plowed field or globs of wet beach sand. When placed in aluminum foil the crinkles of the foil will leave imprints on the rocks, and they must be handled with care to assure they do not disintegrate.

Other samples are much tougher and progress in uniform gradations to extremely tough fragmental rocks with physical properties resembling building stone or masonry.

The Apollo 14 rocks exhibit various degrees of crystallinity, with the tougher, more cohesive samples tending to be more crystalline. The tougher rocks also generally appear to be impregnated with a smaller quantity of particles associated with the solar wind such as carbon and rare gasses, with the lowest carbon content (28 parts per million) to be found in the largest rock -- a tough, 20 pound (9 kilogram) fragmental boulder, and the highest carbon content (225 parts per million) to be found in one of the crumbly, fine-grained rocks.

The soil at the Apollo 14 site appears physically similar to the soil seen at the Apollo 11 and 12 locations, although there are some marked differences, particularly in chemistry.

The chemistry of the Apollo 14 soil closely resembles the chemistry of many of the rocks from that site. This contrasts with the Apollo 11 and 12 soils, which differed in chemistry from most of the rocks collected at these sites.

The extent and quantity of dust adhering to surfaces was less than on previous missions. The Modularized Equipment Transporter, for example, which was reported by the astronauts as occasionally "spraying" dust around, did not collect thick layers of dust.

A large solar flare, which occurred on January 25, just prior to the Apollo 14 mission, presented a unique opportunity to study solar flare products in the sample material and to determine the recent orientation on the lunar surface of the rocks. The orientation of one of the two igneous rocks has been determined using a radioactive isotope produced on the side of the rock facing the sun during the flare

Add 4 MSC 71-14

The Apollo 14 astronauts collected the lunar material at Fra Mauro on February 5 and 6, and the first shipment of Apollo 14 rocks and soil arrived at the Manned Spacecraft Center's Lunar Receiving Laboratory on February 11. The total return had arrived by February 17.

Lunar Receiving Laboratory, where the lunar material has been held in quarantine since its arrival in Houston. All samples were processed in pure nitrogen in glass and stainless steel glove cabinetry designed to protectithe earth environment from the lunar material until it has been established that the sample contains no harmful organisms. At the same time the glass-walled cabinets protect the sample from being contaminated by earth's environment.

Results from the preliminary examination of the Apollo 14 sample will be used in dividing part of the sample for distribution to more than 175 scientific teams in the U.S. and in foreign nations shortly after quarantine release of the samples.

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NOTIONAL AERONAUTICS AND SPACE ADMINISTRATION
MANNED SPACECRAFT NASA HOUSTON

483-5111

MSC 71-15 April 2, **197**1

HOUSTON, TEXAS--Man in space and man-in-the-sea will be topics discussed at the annual meeting Wednesday, April 7, of the Clinical Society and Commissioned Officers Association of the U.S. Public Health Service, to be held at the NASA Manned Spacecraft Center.

The morning portion of the program will be devoted to an overview of medical support of man in space, and the afternoon portion will be a discussion of the man-in-the-sea.

Dr. Charles A. Berry, Director of Medical Research and Operations at MSC will discuss an overview of medical support to man in space.

Other man in space speakers will be Dr. Lawrence F. Dietlein - "Future Concerns of Biomedical Engineering," Dr. Malcom Smith - "Space Food Systems," Dr. Edward Moseley - " Medical Information Systems," and Dr. Sam Pool - "Medical Applications of Space Technology."

The man-in-the-sea program will include presentations by Dr.

Stewart Wolf - "Plans and Purposes of the Marine Biomedical Institute,"

Dr. Richard Masson - "Preview of Medical Observations of Saturation

Diving of Tektite II," Dr. Edward Beckman - "Potentials of Texas

Tektite on Flower Gardens," and Dr. William Willis - "Lessons for Neurobiology."

The Public Health Service conference is being held at the Moody Hall, Galveston, on April 5 and 6, and the final day's program is

Add-1 MSC 71+15

scheduled for MSC on April 7. Surgeon General of the U.S., Dr. Jesse Steinfeld, is scheduled to head up the approximately 200 conferees who will attend the MSC program, starting at 11:00 a.m. in the Building 1 auditorium.

TICS AND SPACE ADMINISTRATION

NNED SPACECRAFT

483-5111



Houston

MSC 71-16 April 6, 1971

HOUSTON, TEXAS -- The National Aeronautics and Space Administration today began distributing 15 pounds (7.02 kilograms) of the 94 pounds 642.64 kilograms) of sample returned Mfnom the moon's Fra Mauro formation by the Apollo 14 astronauts.

One hundred eighty seven scientific teams in the United States and 14 foreign countries are scheduled to receive portions of rock and soil from the third U. S. lunar landing. In all, more than 700 scientists will be directly involved in analyzing the samples, believed to include material formed at the same time as the original lunar crust.

Investigating teams in the United States are located at 65 different institutions in 30 states and the Virgin Islands. Fifty-six foreign teams are at 41 institutions; following are the number of teams by country:

country		NO. 01	Princi	bre r
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United Kingdom				15
France	直接通过 医二十二			7
Canada		* * *	+	6
West Germany				6
Switzerland			4	5
Australia				4,
Japan				4
India				2
South Africa				2
Brazil				. 1
Finland				1
Holland			J. 17.	1
Italy				1
Norway				11
				56

Each of the investigating teams will analyze the sample for one or more of the following: mineralogy and petrology, chemical and isotopic composition, physical properties and organic characteristics.

Mineralogy and petrology studies are expected to identify rock types and their mode of origin, temperature and pressure conditions of igneous rock formation, and types and origins of particles in fragmental erosional processes such as meteoroid impact and particle bombardment.

Isotopic analysis will be used to age-date the lunar material and will be of particular importance in determining the age of formation of igneous rock particles in the fragmental rocks -- ages which may coincide with the age of the original lunar crust. The age of formation of the fragmental rocks may coincide with the age of the impact that gouged the Imbrium basin out of the ancient lunar crust.

Chemical studies of the trace elements give essential clues to early mineral forming processes in the evolution of the moon; measurements of rare gasses give a record of millions of years of the sun's activity.

Studies of the physical properties of the Fra Mauro material should yield new information on the radiation history of the earth, moon and sun and will aid in determining processes which formed lunar surface materials. Studies of the basic physical characteristics of lunar materials will also assist in interpreting earth-based observations of the moon.

Preliminary organic studies of the returned sample at the Manned Spacecraft Center in Houston showed the Apollo 14 material to have very low carbon content, similar to carbon levels observed in Apollo 11 and 12 rocks. There was no evidence of any lunar organisms. Detailed organic analysis is expected to determine the origin of indigenous carbon compounds seen in lunar material and will determine the structure and relative abundance of organic compounds native to and deposited on the lunar surface.

Only fine material (grain size less than 1 mm) will be distributed on April 6. The first distribution of rocks and chips will be made April 16, at the earliest.

One hundred twenty four scientists, including 31 from foreign countries will receive small quantities of fines in the initial release, which will total about one pound (440.7 grams).

Principal Investigators in the United States may either accept samples personally, have them delivered by courier or receive them by registered mail.

Investigators in foreign countries must either pick up their sample personally at Houston or have it delivered by State Department courier to the U.S. Embassy in his country.

The first shipment of Apollo 14 rocks and soil arrived at the Manned Spacecraft Center February 11, and the entire sample return had arrived by February 17. The lunar material was held in quarantine in the MSC Lunar Receiving Eaboratory until April 4.

PUBLIC INFORMATION OFFICE HOUSTON, TEXAS 77058

713/483-5111



news

MSC 71-17 - RTW

April 9, 1971

HOUSTON, TEXAS...Four turboprop aircraft used by the National Aeronautics and Space Administration for commuting between field centers will be refurbished with the latest nonflammable and fire resistant fabrics and coatings.

The new materials were developed by NASA Manned Spacecraft Center engineers working with private industry for use in manned spacecraft.

Curtains, seat upholstery, carpets and headliner panels will be replaced with such materials as Fluorel-coated durette, fiberglass, and Proban-treated fabrics, and Fluorel-coated Nomex. The twin-engine Grumman Gulfstreams will be flown to Houston for the refurbishment work from their home bases at NASA Langley Research Center, Hampton, Va.; Marshall Space Flight Center, Huntsville, Ala.; and Kennedy Space Center, Fla. The fourth Gulfstream is based at the Manned Spacecraft. Center in Houston.

The nonflammable and fire-resistant materials were developed for use in manned spacecraft interiors where a 100-percent oxygen atmosphere increases the hazard of fire. Potential applications in non-space fields for the new fabrics and coatings are under development at the Manned Spacecraft Center, including aircraft interiors, residential and commercial building interiors and special-purpose garments such as firefighters' clothing and hospital patient gowns.

PUBLIC INFORMATION OFFICE HOUSTON, TEXAS 77058

713/483-5111



news

MSC 71-18

April 14, 1971

HOUSTON, TEXAS...The National Aeronautics and Space Administration has signed a Supplemental Agreement with the Grumman Aerospace Corp., valued at about \$11,577,561 for changes in the Apollo Lunar Module centract.

The agreement formally incorporates into the Grumman contract 178 changes previously authorized by NASA for modification to the contractor's requirements to: Restrain Systems Stowage on the Lunar Surface, Modification to the Lunar Equipment Conveyor Assembly, Replacement of Standard Hasselbald Camera with Second Lunar Surface Hasselbald and 60 mm Lens, Addition of Lunar Geology Exploration Camera, Changes to the Environmental Control Systems, Changes to the IM Documentation Requirements, and Modifications to the Lunar Tools. The modifications pring the estimated value of the Grumman Contract since January, 1963 to approximately \$1,617,510,000.

at its Bethpage, NY facility with support from its field offices in Houston and at the Kennedy Space Center.

PUBLIC INFORMATION OFFICE HOUSTON, TEXAS 77058

713/483-5111



news

April 15, 1971

MSC 71-19-tw

HOUSTON, TEXAS--The Mad Hatter would never be late to his tea party if he had a clock like the one under development in the Manned Spacecraft Center's Information Systems Division laboratory here. The timing device, a technology development in support of future long-duration space flight missions, is so accurate that it would only be off by one second after running 50 years.

Lacking a mainspring or a pendulum, the experimental clock uses the resonant frequency characteristics of the rubidium 87 atom to generate the basic timing pulse. The technique of exciting electrons of the rubidium atom is called "optical pumping." The electrons are induced to resonate at a known frequency, and thus form the basis for keeping extremely accurate time.

For the technically minded, the process works as follows:
rubidium 87 gas in a glass cell is illuminated by a lamp filled
with rubidium 87, and the light in turn passes through a filter cell
containing rubidium 85. The filter cell passes only a selected
bandwidth of light to raise the rubidium atoms in the gas cell
to a higher energy level, and therby extract light energy from
the beam. Microwave energy from a quartz crystal oscillatormultiplier drives the puter electron of the rubidium atom to a
lower energy level. Variations in microwave frequency affect the

Add 1 137 MSC 71-19-tw

net amount of light reaching a photocell and the rubidium atoms are "pumped" to a corresponding energy level. The detected modulated microwave signal, from the photocell, drives a synchronous detector which keeps the crystal oscillator at the atomic resonance frequency. The crystal oscillator in turn drives a frequency synthesizer and time code generators for feeding timing pulses to spacecraft systems and timekeeping displays.

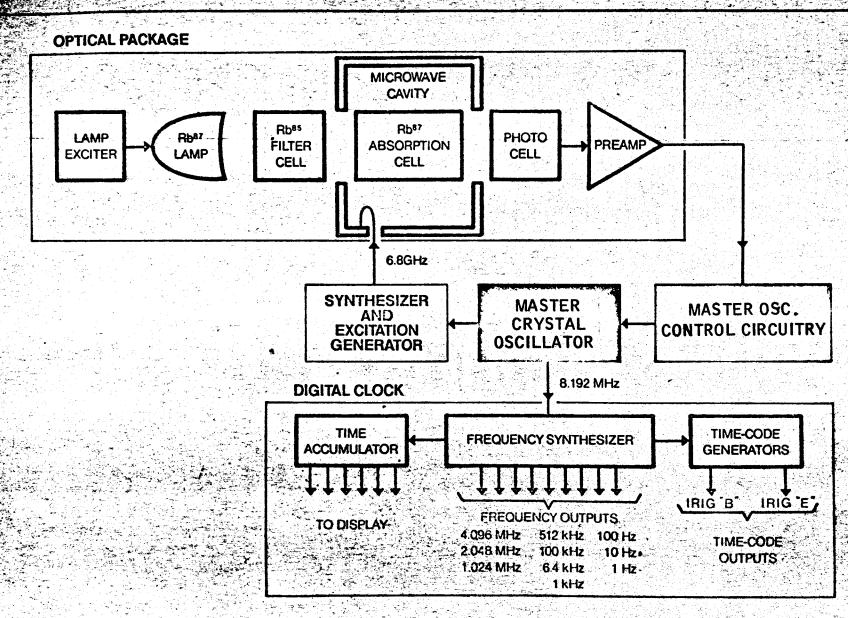
The prototype space clock's accuracy has been measured against two laboratory hydrogen maser frequency standards at the Center in a test that ran for 340 days. Additionally, the clock was tested in simulated space conditions of temperature and launch vibrations.

Weighing about 19 pounds, the prototype timing device is packaged in a box 5 x 5 x 18 inches. The clock operates on 28 volts DC.

General Radio Corporation of West Concord, Mass., has completed a development contract with the Center's Information Systems Division.



SPACECRAFT ADMIC TIMING STANDARD BLOCK DIAGRAM



PRESENT "SATS" CHARACTERISTICS

FREQUENCY STABILITY

SHORT-TERM: 1.6 x 10⁻¹¹ rms (one-second averaging time).

OPERATIONAL ENVIRONMENT

TEMPERATURE RANGE:.....-31°F to + 142°F.

PRESSURE (ALTITUDE):...........760 to 1 x 10-6 mm Hg.

EMI: MSC-IESD-19-3A.

O2 1100%

PUBLIC INFORMATION OFFICE HOUSTON, TEXAS 77058

713/483-5111



news

MSC 71-20-rvg (FOR RELEASE FRIDAY A.M.)

April 16, 1971

HOUSTON, TEXAS--An experiment to determine the response of selected microorganisms to the space environment is planned during the trans-earth coast phase of Apollo 16 scheduled in March 1972.

The experiment, Microbial Response in Space Environment, calls for the Apollo 16 crew to place a small container outside the command module during the extra-vehicular activity planned during the home-ward journey from the moon. The container, the Microbial Ecology Evaluation Device (MEED), which measures $4\frac{1}{2} \times 4\frac{1}{2} \times 9 \text{ 3/4}$ inches, will house a selection of microbial systems, and will be retrieved by the crew after 10 minutes of exposure.

Dr. Gerald Taylor, microbiologist at the NASA Manned Spacecraft Center, Houston, Texas said the purpose of the experiment is to quantitatively measure the effects of certain space environmental parameters (alterations in oxygen pressure, vacuum, weightlessness, and solar ultraviolet irradition), on the microbial test systems. The microbial test systems will include bacteria, fungi, and viruses.

Microbial experiments conducted on the Russian Vostok series,

Geminis 9 and 12, and Biosatellite 2, suggest the possibility that

weightlessness and/or changes in the partial pressure of oxygen may

alter the growth rate and mutation rate of microorganisms. Objective

of the experiment is to evaluate the effects of these factors and

of genetic and responsive alterations stimulated by the UV

Pive strains of microorganisms will be used in the test. Dissection, said. The candidate systems being considered are: Rhodotorula slutinis; Streptococcus mitis, Escherichia coli, Bacillus subfillis, Aeromanas proteclytica, and Pseudomonas boreopolis, Chaetomium, globosum.

The inflight MED package contains three separate trays. Each tray contains 280 chambers into which temperature sensors, UV is measuring solutions and the microorganisms will be placed. A smaller MEED unit, with only one tray, will be maintained in the lunar Receiving Laboratory (LRL) at the Manned Spacecraft Center and will serve as a ground based control unit.

iDr. Taylor estimates a total of approximately 60 million.

microcrganisms will be used in the spacecraft unit and another.

20 million in the unit in the LRL. Two-thirds of the microcrganisms.

will be maintained in a dry state inside the chamber and the remainder will be in water suspension.

Principal Investigators for the experiment are Dr. Paul Volz;

Eastern Michigan University, Ypsilanti, Michigan; Dr. Bill G. Foster and Dr. James M. Prescott of Texas A&M, College Station; Texas; and Dr. John Spizizen, Scripps Clinic and Research Foundation; La Tolla; California.

PUBLIC INFORMATION OFFICE HOUSTON, TEXAS 77058

713/483-5111

MSC 71-21



news

April 16, 1971

HOUSTON, TEXAS--The government of Jamaica has asked the United Nations to assist in surveying Jamaica's natural resources by using aircraft especially equipped for this purpose.

to provide one of its especially instrumented aircraft for flights over the island and its surrounding waters at various altitudes.

An instrumented aircraft of NASA's Manned Spacecraft Center,
Houston, Texas is scheduled to gather high altitude and low
altitude photography and thermal imagery data of Jamaica and its
surrounding coastal waters, beginning April 19. The Food and
Agriculture Organization of the UN, the Geological Survey of Jamaica,
and the U. S. Geological Survey of the Department of Interior are
cooperating in the mission which is being managed by MSC's Science
and Applications Directorate.

The purpose of the mission is to provide experimental sets of photographic and imagery data which will be helpful in planning and developing the islands natural resources including forestry and timber assessment, land use analysis, mineralogic resources development, plant disease detection, and with particular emphasis on water resources.

more

and other radiations which can be measured by sensitive instruments carried by aircraft and spacecraft. The amount and kind of this radiation is different for each type of object and area and is called its signature.

Earth resources surveying consists of obtaining data on the land and water resources of an area from overflights by instrumented sircraft or spacecraft which can be compared with test measurements of the same areas made on the ground. From such surveys extensive information can be obtained about the conditions of crops, forests, mineral deposits, water resources, and fisheries which can be helpful in planning the development of natural resources.

The NASA program of research in earth resources surveying includes the development of techniques and instruments for aircraft and spacecraft remote sensing and the analysis and interpretation of the data obtained.

The NASA four engine aircraft, a modified C-130, is scheduled to fly nine separate flights at varying altitudes, ranging from 5,000 to 25,000 feet. The specific objectives of the mission are:

to provide experimental photographic coverage and thermal imagery of the entire island and adjacent coastal waters from 25,000 feet conduct a thermal infrared survey of selected coastal waters at.

5,000 feet, conduct a low altitude photo and thermal survey of the Rig Minho, the island's water shed, and Rio Minho River Basin from 19,000 feet, and a thermal survey of the Southern Island shelf at 1000 gad 15,000 feet.

The Jamaican Geological Survey assisted by a team from the United States Geological Survey, Department of Interior, will provide personnel and equipment for gathering ground data on land and water.

NASA will provide all data obtained to the government of

The aircraft and scientific and technical team will leave the NASA Manned Spacecraft Center, Houston, Texas on April 18.

PUBLIC INFORMATION OFFICE HOUSTON, TEXAS 77058

713/483-5111



news

April 19, 1971

MSC 71-22-rvg

HOUSTON, TEXAS--Twenty aerospace doctors, engineers and scientists from five National Aeronautics and Space Administration field centers are scheduled to present papers at the 42nd annual scientific meeting of the Aerospace Medical Association which will be held at the Shamrock Hilton Hotel, Houston, Texas April 26-29, 1971.

Approximately 5,000 aerospace doctors from the United States and numerous foreign countries are scheduled to attend the four day session. Scientific and technical exhibits, which reflect current aerospace medical programs and research will also be on display.

Dr. Charles A. Berry, Director of Medical Research and Operations at the NASA Manned Spacecraft Center, is out-going president of the organization. Capt. Ralph L. Christy, MC, USN, is the incoming president.

NASA personnel from the following NASA centers are scheduled to present papers - Ames Research Center, Moffett Field, Calif.; Langley Research Center, Langley Field, Virginia; Lewis Research Center, Cleveland, Ohio; Manned Spacecraft Center, Houston, Texas; and Marshall Space Flight Center, Huntsville, Alabama. Several NASA Headquarters papers are also scheduled to be presented.

The NASA papers discuss various findings from Apollo manned space flight as well as man's role in future programs of Skylab and Shuttle.

PUBLIC INFORMATION OFFICE HOUSTON, TEXAS 77058

713/483-5111

news

April 19, 1971

71-23-dg

HOUSTON, TEXAS--The NASA Manned Spacecraft Center requested proposals from the aerospace industry for development of a human waste collecting and storage system for the orbiter stage of the Shuttle.

In its instructions to industry, MSC noted that previous waste management concepts have placed emphasis on reclamation of materials in a zero "G" environment. With the onset of a reusable space transportation system, the management of waste requires refinement and accommodations for both male and female crew members.

The proposal calls for a system which will:

- a. Be as earthlike as possible in human operation.
- b. Have long duration operating capacity.
- c. Be of high reliability.
- d. And be readily maintainable during ground servicing.

The contractor will fabricate for testing a fully functional unit that can be used individually during a week-long test by a team comprised of three men and one woman.

The proposal calls for a cost-plus-a-fixed-fee contract. MSC has allotted approximately \$90,000 for use in the study and development.

Proposals are to be submitted by May 12. The effort is to be completed approximately 13 months after contract award. It will be conducted under direction of the Crew Systems Division.

MANNED SPACECRAFT CENTER PUBLIC INFORMATION OFFICE HOUSTON, TEXAS 77058

713/483-5111



news

71-24-rtw

April 20, 1971

HOUSTON, TEXAS--A three-day conference to examine electronics technology having space shuttle applications will be held May 11-13 at the National Aeronautics and Space Administration Manned Space-craft Center here. Called the Space Shuttle Technology Conference on Integrated Electronics, the meeting will be in the Center's main auditorium.

The May 11 morning session will be devoted to a general overview of subjects related to electronics development, and the afternoon session will cover instrumentation and power distribution and communications. The final day's sessions will be on data systems.

MSC Assistant Director for Electronics Systems, Robert A.

Gardiner, conference chairman, said the conference will "contribute significantly toward establishing the hard technology base necessary for initiation of the space shuttle design and development." Electronics and avionics specialists from NASA, Department of Defense and industry are expected to attend the conference.

Conference registration is being handled by Rexford Talbert, Code EG9, NASA Manned Spacecraft Center, Houston, Texas 77058.

PUBLIC INFORMATION OFFICE HOUSTON, TEXAS 77058

713/483-5111



MSC 71-25

April 21, 1971

HOUSTON, TEXAS...NASA's Manned Spacecraft Center has signed a \$10,699,404 contract modification with Martin Marietta Corp. for equipment in support of the Skylab Earth Resources Experiment Package (EREP).

The Skylab EREP consists of a package of five scientific experiments for the first Skylab Earth-orbital mission to be flown in early 1973.

The modifications formally incorporated into the Martin Marietta contract the EREP support equipment and includes the electrical-electronic system, tape recorder system, control and display panel and equipment racks.

This brings the total value of the contract since February 1970 to about \$60 million.

Martin Marietta performs most of the work on the contract at its Denver, Colo. facility with support from other divisions at Baltimore, Md. and Orlando, Fl. .

PUBLIC INFORMATION OFFICE HOUSTON, TEXAS 77058

713/483-5111



news

May 3, 1971

MSC 71-29 dg

HOUSTON, TEXAS--The National Aeronautics and Space Administration today asked aerospace firms for proposals to study safety techniques for spacecraft flying in Earth orbit.

The request was issued by NASA's Manned Spacecraft Center.

In its instructions to industry, MSC identified the study objectives as the analysis of hazards on specific programs which will "enhance the safety of future manned spaceflight operating in Earth orbit."

The proposal calls for studies involving the Space Shuttle--planned for operations in the late 1970's--and the Modular Space Station, which is planned for the 1980's.

Five specific tasks are called for during the period of the study.

Analysis of escape, rescue and survivability is task number one.

Previous studies generally were confined to rescue of small numbers of personnel. In this proposal, the contractor is requested to adapt to concepts incorporating larger groups—specifically, sizes up to 12 personnel.

Task number two calls for analysis of escape routes and traffic patterns. Examples include the study of dual escape routes, whether dual access to safety areas is essential, if interior hatches should be left open during normal operations and the pros and cons of outside (extravehicular) versus inside (intravehicular) methods for escape.

In the third task, industry is requested to analyze the potential problems resulting from the delivery of payloads that are hazardous.

The transfer of propellants and live pyrotechnics fall into this group.

Studies have disclosed that direct docking of a Space Plane (Orbiter), with a Space Station could be difficult to accomplish. A portion of the study will address itself to three docking options:

- 1. Direct "hard" docking with cargo extended.
- 2. Docking via a free-flying module that was delivered earlier by the Space Plane.
 - 3. Soft docking using flexible ports.

The fifth task calls for an analysis of recovery techniques when the craft is out-of-control, disabled, or tumbling. How can the tumbling craft be arrested, the proposal asks? If the tumbling cannot be stopped, the contractor is requested to devise rescue procedures.

The kind and nature of space emergencies in this study are assumed to be explosions, fire, meteoroid puncture, collision with another body, the failure of critical systems or toxic atmosphere buildup.

A resuable Shuttle will be used to transport personnel and cargo into low Earth orbit. Concepts call for an airplane-like Booster and Orbiter which will be launched vertically in a piggy-back arrangement. They will separate at approximately 200,000 feet (60,960 meters) altitude with the workhorse Booster returning immediately to Earth and the sleek. Orbiter continuing onward into space. Each will land horizontally like present day jet aircraft.

One of the tasks of the versatile Shuttle is to transport habitable cylindrical volumes into space. These modules will be assembled and will provide living accommodations—initially for six scientific and technical personnel—and later for 12.

The safety calls for a fixed price research and development contract.

MSC has alloted approximately \$125,000 for performance of the study.

Proposals are to be submitted by May 24 and the study effort is to be concluded 12 months after contract award. It will be conducted under direction of the Safety Office.

PUBLIC INFORMATION OFFICE HOUSTON, TEXAS 77058





news

MSC 71-30 dg

May 4, 1971.

HOUSTON, TEXAS -- The Manned Spacecraft Center requested proposals from industry for the development and testing of a lightweight landing gear for the Orbiter portion of the Space Shuttle.

In its instructions to industry, MSC has advised the contractors that the Orbiter will experience long periods in space when temperatures are in the minus range followed immediately by exposure to temperatures of plus 300 degrees F.

The tire-wheel-brake system, as it is called, must survive without leaking; therefore, a study of better sealing techniques also is required.

Like other space hardware, Orbiter is weight sensitive, and the use of materials of lightweight is desirable.

The tire will have an outside diameter of up to four feet, four inches; be inflated to more than 300 pounds per square inch and be capable of withstanding touchdown speeds of 180 knots.

Industry is requested to fabricate two systems for testing.

The proposal calls for a firm fixed-price research and development contract. Proposals are to be submitted by May 17 and the work is to be completed approximately one year after contract award.

It will be conducted under MSC's Structures and Mechanics Division.

PUBLIC INFORMATION OFFICE HOUSTON, TEXAS 77058

713/483-5111



news

May 7, 1971

MSC 71-31 fg

HOUSTON, TEXAS--An instrumented Earth Resources four-engine C-130B of NASA's Manned Spacecraft Center, Houston, Texas is scheduled to fly over the Gulf of Mexico's Flower Gardens Coral Reef during the week of May 10 as a team of medical scientists and oceanographers explore the Flower Gardens.

A 20-man team of professional divers and scientists from the Marine Biomedical Institute, a joint project of the University of Texas Medical Branch and Texas A & M University will begin underwater exploration of the garden area, 110 miles south of Galveston on May 10.

The Flower Gardens, the northern most living coral reefs in the Gulf of Mexico, are being considered as a site for a platform and underwater habitat and above-water laboratory.

Two metric and four multiband cameras, a dual-channel radiometer scanner which measures energy reflected or emitted by earth features and a precision radiation thermometer (PRT-5) to record water temperatures will be used during the flight.

The MSC aircraft will fly at an altitude of 5,000 feet.

The Flower Garden mission is the start of 10-day long Mission 165 which includes flights over Texas coastal waters May 10. Oceanography, Louisiana coastal waters on May 11 - oceanography, Mississippi Delta and Barataria Bay, La. May 14 - hydrology, Trinity Bay, Texas May 17 oceanography and Garden City, Kansas, May 19 agriculture.

The aircraft earth resources flights are managed by MSC's Science and Applications Directorate.

Manager for Mission 165 is Frank Newman of the Earth Resources
Aircraft Project Office.

PUBLIC INFORMATION OFFICE HOUSTON, TEXAS 77058

713/483-5111



news

May 13, 1971

MSC 71-33

HOUSTON, TEXAS--The NASA Manned Spacecraft Center has selected Dynalectron Corporation, Land-Air Division, Holloman AFB, New Mexico to negotiate a contract for support services at NASA's White Sands Test Facility near Las Cruces, New Mexico.

Estimated value of the one year cost-plus-award-fee contract is \$1,805,000.

Under terms of the contract Dynalectron will provide support services for technical and administrative operations, maintenance, security and fire protection at the New Mexico facility. These services were previously handled under three separate support contracts.

The combined support services contract at White Sands is part of a program begun last year by the Manned Spacecraft Center to restructure and consolidate support contracts, reducing overhead costs and making better use of personnel.

Following negotiation of a contract, Dynalectron is scheduled to begin work at the White Sands Test Facility July 1, 1971.

Dynalectron was selected for the contract award from among six firms responding to a NASA request for proposals.

PUBLIC INFORMATION OFFICE HOUSTON, TEXAS 77058

713/483-5111



news

May 17, 1971

MSC 71-36

The Manned Spacecraft Center requested proposals from industry for technological development of new surface materials that can stand the environmental extremes expected to be experienced by the Space Shuttle.

In its instructions to industry, the space agency notes that previous Thermal Protection Systems (TPS) for manned space vehicles were designed for single missions. The requirement now exists for developing new materials that can be reused up to 100 times with minimum refurbishment.

NASA is requesting industries to design, develop and test a ceramic insulation class of materials. This type of material appears to meet the requirements of lightweight, reusability and lower costs; all desired traits for the Shuttle.

Sample tiles sized to 12 x 12 inches x 2 inches thick will be delivered to MSC for specialized testing. The agency plans to expose the panels to hard vacuum, infrared transmissions, radiation, micrometeriod bombardment, freeze/thaw cycles, dust, rain and chemical contaminants.

The proposal calls for a firm fixed price contract. Proposals are to be submitted by May 24 and the work is to be completed about seven months after contract award.

It will be conducted under MSC's Structures and Mechanics Division.

PUBLIC INFORMATION OFFICE HOUSTON, TEXAS 77058

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news

MSC-71-38

June 11, 1971

HOUSTON, TEXAS---The National Aeronautics and Space Administration today asked aerospace firms for proposals to develop, construct and test a model cryogenic supply system for use in the Space Shuttle.

The request was issued by NASA's Manned Spacecraft Center.

In its instructions to industry, MSC calls for a two-phase effort using cryogens such as liquid oxygen and liquid hydrogen. In phase one the contractor will design and ground test a prototype system.

Phase two will provide a subscale model system and a flight test plan.

MSC notes that cryogenic propellants require thermal conditioning prior to use. One of the major problems is boil-off including vapor-ization in feedlines. As the propellants vaporize, the liquids are forced from the outlets cutting fuel supply to the engines.

The Shuttle Orbiter requires numerous starts in space during the extended missions planned for it; consequently, a low-risk, efficient cryogen system must be designed.

The reusable Shuttle will be used to transport personnel and cargo into low earth orbit. Concepts call for an airplane-like Booster and Orbiter which will be launched vertically in a piggy-back arrangement. They will separate at approximately 200,000 feet (60,960 meters) altitude with the workhorse Booster returning immediately to earth and the sleek Orbiter continuing onward into space. Each will land horizontally like present-day jet aircraft.

The proposal calls for a cost-plus-fixed-fee research and development contract. Proposals are to be submitted by July 2 and the two phases of work will be concluded approximately 17 months after contract award.

It will be conducted under the direction of MSC's Power and Propulsion Division.

PUBLIC INFORMATION OFFICE HOUSTON, TEXAS 77058



713/483-5111

news

MSC 71-40 HOLD FOR RELEASE -- June 26, 1971

June 25, 1971

HOUSTON, TEXAS--Soil returned from the Fra Mauro region of the moon where Apollo 14 landed appears distinctly different from soil collected at mare sites visited by previous Apollo missions according to studies of the material by scientists at the NASA Manned Spacecraft Center in Houston. Apparently at least two types of rock developed early in the moon's history.

Dr. Arch Reid of the Geochemistry Branch of MSC today told scientists attending the annual meeting of the Committee on Space Research (COSPAR) in Seattle that in contrast to the Apollo 11 and 12 rocks, which are called mare basalts, the Fra Mauro material is significantly lower in the ratios of calcium to aluminum and iron to magnesium and is higher in several minor and trace elements such as potassium, barium, and the rare earth elements.

Dr. Reid said chemical and mechanical mixing of mare basalts and, Fra Mauro material has occurred in the formation of the loose soil or regolith that covers the lunar surface. Scientists at MSC had earlier discovered a non-mare component in the mare soil. At the Apollo 14 site this non-mare material predominates, and material from the mare areas is a minor component, comprising only about ten percent of the Fra Mauro soil.

Detailed studies of soil returned from Apollo 14 reveal that the
Fra Mauro formation contains a series of similar basaltic materials

which are quite different from the iron and titanium-rich mare basalts. The Fra Mauro materials are probably all genetically related and may be derived by partial melting and crystallization processes from a parent rock type at shallow depth.

Dr. Reid said one of the rock samples returned by the Apollo 14 astronauts, an eleven and a half pound igneous rock designated sample 14310, has essentially the composition predicted for the parent of the Fra Mauro material. The texture of rock 14310, he said, implies that liquids of this composition once existed at the lunar surface.

Coupling the information from the Apollo 14 samples with the earlier studies of mare samples from 11 and 12, Dr. Reid said, we now have sampled two distinct types of lunar material. The mare samples are iron-rich basalts derived about a billion years after the formation of the moon by partial melting of the lunar interiro. The Fra Mauro samples provide evidence of development presumably early in lunar history of a comples crust, enriched in trace elements. While quite distinct, said Dr. Reid, both systems have chemical compositions that are unlike any suggested primitive material from which the moon may have originally formed. Thus evidence to date, he said, suggests that the moon is a complex, heterogeneous body with marked differences in composition between the interior and the outer portions.

PUBLIC INFORMATION OFFICE HOUSTON, TEXAS 77058

713/483-5111



news

June 22, 1971

MSC71-41

HOUSTON, TEXAS...The National Aeronautics and Space Administration,
Manned Spacecraft Center, has selected General Electric Company, Houston
Operations, Houston, Texas, to provide Flight Garments and Crew Provisions
for use in the Skylab Pregram.

The \$576,730 cost-plus-fixed-fee contract encompasses a program that will provide design, development, fabrication, test, cleaning, storing, and shipping functions for certain flight garments and crew provisions; as well as related documentation. Items falling within the consideration of the proposed contract are: inflight coverall garments, constant wear garments, shirts, rucksacks, brushes, tote bags, survival equipment and ground support equipment such as penlight batteries and radio beacon testers.

Centralized and coordinated activity in the area of flight garments and crew provisions will be achieved through this multitalent capability which will operate for a period of 31 months extending to early 1974.

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PUBLIC INFORMATION OFFICE HOUSTON, TEXAS 77058

713/483-5111



news

MSC 71-42

June 21, 1971

HOUSTON, TEXAS--Jamaican and United Nations officials today began a five day visit to the NASA Manned Spacecraft Center, Houston, to review earth resources data collected in April.

The island survey was a cooperative effort between the government of Jamaica and the United Nations Food and Agriculture Organization to gather information needed in assessing the island's natural resources and, in particular, its water resources. Assistance was also provided by consultants from the U. S. Geological Survey.

The seven-member group of geologists and hydrologists is headed by John Williams, Director of the Jamaican Geologic Survey and by David Wozab, Project Manager of the United Nations Development Programs (FAO), Jamaican Water Resource Development and Management Project.

During the week the group will be shown data collected over Jamaica and will receive briefings from MSC officials on techniques which may be used in interpreting the data. They will also receive background briefings on NASA earth observations programs.

Anthony J. Calio, Director of Science and Applications at the Manned Spacecraft Center said data collected during the Jamaican aircraft mission will be used as a basis for weeklong discussions and working sessions in principles of photogrammetry and photointerpretation, the physics of remote sensing and its applications to hydrology, agriculture and forestry, and health problems.

-more-

The purpose of the Jamaican group's visit to MSC is to participate in a review of the data acquired and to train with analysis equipment prior to return to Jamaica with the data. NASA C130B aircraft flights were conducted at the joint request of Jamaica and the U.N. primarily to learn more about the tropical island's water supply. Although Jamaica has an average annual rainfall of 200 inches, much of the water in the mountain rivers never reaches the reservoirs of Jamaica's cities. It is believed that submarine springs carry a portion of the water offshore into the Caribbean.

at MSC said excellent data was gathered on the flights, which he said was supplemented by the most complete "ground truth" operation yet attempted by the MSC aircraft program. Jamaican and U.N. field teams moved about the island on an hourly basis in order to be in position when the MSC aircraft flew over. At the same time scuba divers gathered information on water temperatures which will be used to spot check results obtained on a large scale by the aircraft.

PUBLIC INFORMATION OFFICE HOUSTON, TEXAS 77058

713/483-5111



news

June 25, 1971

71-42

HOUSTON, TEXAS -- Two veteran astronauts have received key assignments within the Manned Spacecraft Center's Flight Crew Operations Directorate.

Col. Thomas P. Stafford has been named Deputy Director, and Capt.

Alan B. Shepard will resume his previous duties as Chief of the Astronaut

Office.

In addition to taking part in overall management of the directorate, Colonel Stafford will assist the Director of Flight Crew Operations, Donald K. Slayton, with a broad range of technical matters relating to flight crew activities. The Deputy Director's position has been vacant.

Colonel Stafford has been an astronaut since 1962. He was pilot of Gemini VI in December 1965, command pilot of Gemini IX in June 1966, and commander of Apollo 10, which orbited the moon in May 1969. He succeeded Captain Shepard as Chief of the Astronaut Office in August 1969.

Captain Shepard returns to an assignment he held for several years prior to commanding the recent Apollo 14 lunar landing mission. One of the original astronauts selected in 1959, he flew the United State's first manned space flight in May 1961. The Navy has selected Captain Shepard for promotion to Rear Admiral.

The Flight Crew Operations Directorate is responsible for providing flight crews, crew procedures and training, and support aircraft for all manned space flight missions. The directorate also operates the 36 aircraft and the Lunar Landing Training Vehicle assigned to MSC.

Add 1 71-42

More than 1,100 civil service, military and contractor personnel are assigned to the directorate, including the 45 astronauts on space flight status.

PUBLIC INFORMATION OFFICE HOUSTON, TEXAS 77058

713/483.5111



news

MSC 71-43

June 25, 1971

HOUSTON, TEXAS---The five-day meeting of representatives and specialist working groups of the USSR Academy of Sciences and the U.S. National Aeronautics and Space Administration was concluded here today.

N. Petrov, Chairman of the Intercosmos Council of the USSR Academy of Sciences, and Dr. Robert R. Gilruth, Director of the NASA Manned Spacecraft Center, initialled a "Summary of Results" which is subject to confirmation by the President of the USSR Academy of Sciences and the Administrator of the National Aeronautics and Space Administration.

The delegations from both nations considered and discussed questions of principle and drafts of technical requirements for compatible rendezvous and docking systems of manned spacecraft and stations. Agreement was reached on a number of questions. A number of other questions require further discussion.

The current summary contains detailed lists of technical requirements for coordinate systems, optical and radio references, communications, atmospheres, docking hardware and other factors in rendezvous and docking operations where the two sides were in specific accord. Provision was also made for the exchange of additional information or for further discussion where required. The bulk of the requirements fall into the category of agreed items.

A compatible rendezvous and docking system would make it possible for spacecraft and stations to jointly carry out docking missions in outer space and, for humane purposes, would provide for a rescue capability in emergency manned flight situations.

Delegates from both nations discussed the possibility of future experiments that might be used for the purpose of testing the technical requirements and solutions for compatible rendezvous and docking systems of Soviet and American manned spacecraft and stations.

The study of such experiments would be based on the premise that a first such experiment might be the docking of an Apollo spacecraft with a manned orbital scientific station of the Salyuttype and a subsequent experiment might be docking of a manned spacecraft of the Soyuz-type with an orbital scientific station of the Skylab-type.

Academician Petrov and Dr. Gilruth said that the meetings were conducted in a business-like atmosphere. Both expressed considerable gratification at the very rapid and substantive progress of their specialist working groups toward a comprehensive set of agreed requirements. The next meeting is planned for the end of the year in Moscow.

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PUBLIC INFORMATION OFFICE HOUSTON, TEXAS 77058

713/483-5111



news

June 28, 1971

MSC 71-44

HOUSTON, TEXAS -- The NASA Manned Spacecraft Center has signed a contract with the North American Rockwell Corporation, Downey, California to study safety techniques for spacecraft flying in Earth orbit.

Amount of the fixed price research and development contract is \$125, 000 and its period of performance is 12 months.

The agreement formally incorporates five specific study tasks relating to the Space Shuttle and the Modular Space Station. They are:

Analysis of escape, rescue and survivability is task number one.

Previous studies generally were confined to rescue of small numbers of personnel. In this proposal, the contractor is requested to study concepts incorporating larger groups -- specifically, up to 12 personnel.

Task number two calls for analysis of escape routes and traffic patterns, particularly in space stations. Examples include the study of dual escape routes, whether dual access to safety areas is essential, if interior hatches should be left open during normal operations and the pros and cons of outside (extravehicular) versus inside (intravehicular) methods of escape.

In the third task, North American will analyze the potential problems resulting from the delivery of payloads that are hazardous. The transfer

of propellants and live pyrotechnics fall into this group.

Studies have disclosed that direct docking of a Shuttle Orbiter with a Space Station could be difficult to accomplish. A portion of the study will address itself to three docking options:

- 1. Direct "hard" docking with cargo extended.
- 2. Docking via a free-flying module that was delivered earlier by the Space Plane.
 - 3. Soft docking using flexible ports.

The fifth task calls for an analysis of recovery techniques when the craft is out-of-control, disabled, or tumbling; and assuming the tumbling cannot be stopped, the contractor is requested to devise rescue procedures.

The kind and nature of space emergencies in this study are assumed to be explosions, fire, meteoroid puncture, collision with another body, the failure of critical systems or toxic atmosphere buildup.

MSC's Safety Office will monitor the contract.

PUBLIC INFORMATION OFFICE HOUSTON, TEXAS 77058

713/483.5111



news

MSC-71-45

July 1, 1971

HOUSTON, TEXAS...Eugene H. Brock, Deputy Assistant Director for computation and flight support at the NASA Manned Spacecraft Center has accepted a position as director of computing activities at the University of Virginia and of the Region II computing center for the State of Virginia. He will also hold an appointment as professor of electrical engineering in the University of Virginia School of Engineering and Applied Science.

Brock will assume his new duties at the University of Virginia about the middle of August.

He received his bachelors, degree in Mathematics from Texas Technological College and bachelors and masters in engineering from Texas A & M University where he served as assistant dean of the school of engineering. Before joining NASA in 1962, he managed the computer center for General Electric Company at the NASA Marshall Space Flight Center in Huntsville, Ala.

In his new position Brock will have prime responsibility for the University of Virginia's three main computer centers---administrative data, processing, computer-science and medical---and for arranging and coordinating computer services required by the 20 colleges and universities served by Region II of Virginia.

Brock is married to the former Virginia Dare Wood of Childress, Texas and they have two grown children.

PUBLIC INFORMATION OFFICE HOUSTON, TEXAS 77058

713/483-5111



news

July 1, 1971

MSC 71-46

HOUSTON, TEXAS--The National Aeronautics and Space Administration has extended its space shuttle preliminary design contracts with four industry teams.

The companies are: McDonnell-Douglas Corp., St. Louis, Mo., with Martin-Marietta as a major subcontractor; North American Rockwell Corp., Downey, Calif., with General Dynamics as a major subcontractor; Grumman Aerospace Corp., Bethpage, N.Y., with the Boeing Co. as a major subcontractor; and Lockheed Aircraft Corp., Burbank, Calif.

The fixed price contracts are extended for four months effective July 1, 1971.

Each company has been requested to study the advantages and disadvantages of a "phased approach" to the development of the space shuttle in which the orbiter vehicle would be built first and initially tested with an interim expendable booster. Based on data from these studies, NASA expects to decide this fall if a "phased development" of the shuttle will be undertaken instead of concurrent development of both the orbiter and booster.

Three of the contracts are valued at approximately \$2,800,000 each; the contract with Lockheed, at approximately \$1,400,000.

Candidate interim expendable launch vehicles include a modification of the S-IC (first) stage of the Saturn V launch vehicle; an outgrowth of the Titan III rocket; a single 260-inch-engine solid booster; and multiple 120-inch or 156-inch solid rockets.

Add 1 MSC 71-46

The team headed by McDonnell-Douglas will study solids and the Titan type; Grumman, the S-IC and solids; Lockheed and North American Rockwell solid booster variations.

The extended studies also will look at orbiter configurations having external, expendable hydrogen and oxygen propellant tanks and smaller payload bays.

The McDonnell-Douglas and Lockheed studies are managed by the Marshall Space Flight Center, Huntsville, Ala., and the North American Rockwell and Grumman studies by the Manned Spacecraft Center, Houston.

The shuttle will reduce both launch and payload costs of Earth orbital missions. Among the user-services will be the deployment of unmanned spacecraft, satellite repair and retrieval for refurbishment and reuse, space rescue, short-duration science and applications, and ultimately space station supply.

PUBLIC INFORMATION OFFICE HOUSTON, TEXAS 77058





news

MSC 71-47

July 6, 1971

HOUSTON, TEXAS...The NASA Manned Spacecraft Center has selected the McDonnell-Douglas Corporation, St. Louis, Missouri for extension of a design study of the Auxiliary Propulsion System (APS) for the Space Shuttle.

Amount of the firm price contract is \$380,000 and its period of performance is 10 months.

Object of the work is to define a oxygen-hydrogen system which is compatible for use in both the Booster and the Orbiter vehicles.

Auxiliary propulsion consists of a space-qualified Orbital Maneuvering System (OMS) and a Reaction Control System (RCS) on the Orbiter, and the RCS only on the Booster.

McDonnell-Douglas will carry out the five-phase study as follows:

- 1. Definition of requirements
- 2. Candidate RCS comparisons
- 3. Integration of RCS and OMS
- 4. Special studies designed to eliminate either turbopumps or heat exchanger in the RCS.
 - 5. And, finally, a detailed study of the most promisiong APS concept.

 The systems must be cost effective, simple to manufacture, lightweight and have high reliability.

-More-

The Space Shuttle is a reusable vehicle which provides an economical means of performing Earth orbital space missions. This includes industrial and scientific experiments, defense missions, the placement of weather and communications satellites and the servicing orbiting space stations.

Unmanned satellites also can be inspected and serviced in space or be retrieved for return to Earth. Additional savings result in the design development and checkout of satellites themselves.

MSC's Propulsion and Power Division, will monitor the study.

PUBLIC INFORMATION OFFICE HOUSTON, TEXAS 77058





news

MSC 71-48

HOUSTON, TEXAS...The Apollo 15 crew, now in final training and pre-launch preparations Wednesday received a "medical go" from Dr. Charles A. Berry, Director of Medical Research and Operations following the first in a series of medical examinations.

physicals confirm that the prime crew and backup crews have no abnormalities and at this time are cleared for launch. The prime crew - mission commander David R. Scott, command module pilot A. M. Worden and lunar module pilot James B. Irwin - received their preliminary physicals on June 29. The backup crew of astronauts Richard F. Gordon, Jr., Vance D. Brand and Harrison A. Schmitt - underwent their physicals the previous day.

Dr. Berry said the laboratory tests of last week's physicals were completed Tuesday at the NASA Manned Spacecraft Center and the lab workup confirms the health of the crew members.

The crews will undergo additional physical examinations on July 12, at F-5 days on July 21, and on launch morning.

In order to reduce to possible exposure of the crews to disease or illness, a program of close medical surveillance was instituted this week at Caps Kennedy and the Manned Spacecraft Center. In addition to medical surveillance, the program similar to that initiated prior to Apollo 14, calls for close control of the numbers of people having contact with the crew.

The Flight Crew Health Stabilization Program generally provides clinical medicine, and immunology programs, and limitation of the number of outside contacts with the flight crew.

- Crew members (prime and backup) will reside solely in the Crew Quarters while at the Kennedy Space Center for a period of 21 days prior to launch.
- Access to primary training areas utilized by crew members will be controlled by the KSC security forces while occupied by flight crews.
- Access to areas during crew occupancy will be limited to properly badged primary contacts, or by waiver from the Director of Flight Crew Operations and subject to medical clearance from the Director of Medical Research and Operations.
- The major scope of crew activities will be limited to the primary areas of the Manned Space Operations Building (MSOB) and Flight Crew.

 Training Building (FCTB), the flight line, and launch pad white room during the 21 day prelaunch period. Primary areas of the MSOB and FCTB are those areas with special air conditioning. Crew access to other than these areas requires special approval.
- Crew members will use personal vehicles when traveling from one primary area to another. The transfer van will be used when crew members travel from MSOB to the launch pad.

In the event crew members are required to be at MSC for training purposes they will reside in their own residence or the crew reception area of the Lunar Receiving Laboratory. Appropriate security controls will be implemented if crew members choose to stay in their homes while at MSC and children and everyone but the wife who is primary contact will be excluded.

-more-

MSC 71-48 Add 2

Starting 60 days prior to launch all illnesses occurring in family members of prime, backup, and support crews, as well as close contacts of these families are being reported to medical officials. A group of KSC employees will be similarly followed.

Primary contacts (wives, backup crew members, mission essential personnel) have been given physical examinations as early as 90 days prior to launch.

The follow-on medical surveillance is expected to maximize the possibility that those who come in contact with the crew prior to launch are healthy.

PUBLIC INFORMATION OFFICE HOUSTON, TEXAS 77058

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news

MSC 71-48

July 8, 1971

HOUSTON, TEXAS--The National Aeronautics and Space Administration has selected Lockheed Electronics Co., Inc., Houston, for negotiation leading to the award of a contract to provide general electronic, scientific, and computing center support services at the Manned Space-craft Center, Houston. Four companies submitted proposals for this work.

Lockheed's cost proposal for the one year, cost-plus-award fee contract is approximately \$20 million. The contract will contain provisions for four additional one-year periods.

The contractor will support the Engineering and Development,
Science and Applications and Flight Operations Directorates in a wide
variety of support functions associated with the computer operations
and maintenance, general electronic, instrumentation, engineering, and
Earth observation activities at MSC.

PUBLIC INFORMATION OFFICE HOUSTON, TEXAS 77058





news

MSC 71-49

July 9, 1971

HOUSTON, TEXAS--Twenty-four U.S. scientists today began receiving samples of soil returned from the moon by the Soviet Urrion's Luna 16 spacecraft.

Three grams of the Soviet sample, returned from the moon's Sea of Fertility by the unmanned Luna on September 24, were provided the U.S. in exchange for three grams each of Apollo 11 and 12 lunar sample.

The exchange was based on an agreement reached January 21, 1971 between the U.S. and the Soviet Union.

Dr. Larry A. Haskin, Vice Chairman of the Lunar Sample Analysis

Planning Team said "Acquisition of part of the Luna 16 material obtained by the Russians makes possible important measurements on an area of the moon that will not be sampled in the Apollo program."

Dr. Haskin, Professor of Chemistry at the University of west of Wisconsin, Madison, and Dr. Paul Gast, Chief of the Planetary and Earth Sciences Division at the NASA Manned Spacecraft Center, Houston, were members of a group headed by Lee R. Scherer, Director, Apollo Lunar Exploration Office, NASA Headquarters, Washington, which delivered the U.S. sample and picked up the Soviet sample in Moscow June 10.

published by the Russians imply that the loose material or regolith covering the Sea of Fertility where Luna 16 landed contains significant differences from such material sampled on three U.S. Apollo missions.

Dr. Gast said Soviet scientists feel the Sea of Fertility regolith is much thinner and therefore closer to underlying strata than the soil of other lunar mare areas.

He also noted that the Soviet sample, which was collected in a hollow core tube similar to core tubes which have been used in Apollo, contained a much wider gradation of individual grain sizes than was seen in core samples returned by U. S. astronauts.

The three grams of sample provided NASA for distribution to U. S. scientists includes 1.5 grams from near the top of the 35 centimeter core tube and 1.5 grams from near the bottom of the tube. The sample is mostly fines and coarse fines with several small pebble size fragments interspersed. The largest of the pebbles in the U. S. sample weighs 62 milligrams and is described by the Russians as a coarse grained basaltic rock fragment.

Only about 600 milligrams of fine materials (about 20% of the total sample) will be distributed in the initial allocation of the Soviet sample. In describing the sample distribution plan, Dr. Haskin said, "Although we feel that one-half or more of the available Luna 16 material can reasonably be distributed to principal investigators over the next few months, we believe that it is best to do this in at least two stages."

These initial studies, he said, should provide the information needed to develop a more complete plan for distribution and study of about 50% of the total sample during the next twelve months.

Dr. Gast said a major challenge to scientists studying the Luna 16 material will be to learn from tiny fragments no more than one-eighth inch in diameter many of the same things we learned from large rocks from Apollo missions.

Results of exchange sample studies by U. S. and Soviet scientists will be shared by the two groups and will be compared with similar studies being conducted by French scientists on Luna 16 samples provided in a separate agreement between France and the Soviet Union.

PUBLIC INFORMATION OFFICE HOUSTON, TEXAS 77058

713/483-5111



news

MSC 71-52

July 23, 1971

HOUSTON, TEXAS--John T. Donnelly, Vice President for Corporate Communications, Whittaker Corporation, has been appointed Assistant Administrator for Public Affairs, National Aeronautics and Space Administration, effective about August 15, 1971.

Donnelly will be responsible for the development and direction of NASA's public affairs activities including Public Information, Public Services, and Educational Programs. These functions are carried out by the Office of Public Affairs at NASA Headquarters and by Public Affairs personnel at the NASA field centers, in accordance with the provisions of the NASA Space Act of 1958, requiring NASA to "Provide for the widest practicable and appropriate dissemination of information concerning its activities and the results thereof."

Donnelly has been in charge of the Public Relations and Advertising Policies at the Whittaker Corporation since early 1970. Whittaker Corporation is a large diversified Los Angeles based company. Prior to that he had been Director of Corporate Communications for A-T-O Incorporated, a diversified Cleveland based company.

His previous experience in public relations includes a year with F. W. Dodge Corporation, New York City (now a division of McGraw Hill) and eight years in the Public Relations Division of Texaco Incorporated:

Donnelly was graduated from Long Island University with a BA in journalism in 1958, after military service in the U.S. Navy. A native of New York City, he now resides in Los Angeles. He is married and has five children.

PUBLIC INFORMATION OFFICE HOUSTON, TEXAS 77058





news

MSC 71-53

July 24, 1971

HOUSTON, TEXAS---Five flotation collars scheduled for deployment in USAF Aerospace Rescue and Recovery Service aircraft from Eglin AFB, Florida for the July 26 launch of Apollo 15, were slashed with a knife sometime between July 13-19 while in storage at Eglin.

The damaged flotation collars were discovered during a routine inspection and inflation of the collars prior to loading them on the aircraft. The collars have been replaced by the Naval Rework Facility at the Pensacola Naval Air Station in Florida, where the units are manufactured. The incident will have no impact on the Apollo 15 mission.

An investigation is being made by the USAF Office of Special Investigation and all the information will be turned over to the Federal Bureau of Investigation.

Two of the flotation collars were scheduled for use on an ARRS aircraft deploying out of Eglin on July 26 to cover Station A in the North Atlantic in case of an abort. Of the other three collars, two were scheduled for the backup aircraft with one for a spare.

Value of the flotation collars is about \$5,000 each. The slashed collars will be repaired and used for training purposes only.

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PUBLIC INFORMATION OFFICE HOUSTON, TEXAS 77058

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news

MSC 71-53

July 30, 1971

The National Aeronautics and Space Administration, beginning the week of August 2, will undertake a cooperative program with state, local and federal agencies to determine how the cooling water of an area power company affects the flow and temperature characteristics of Trinity Bay.

The Trinity Bay study is part of an on-going cooperative program with numerous other agencies and is also designed to determine how well mathemathical models can predict changes in water temperatures. Participants in the study include NASA-MSC, Environmental Protection Agency, Texas Water Quality Board, U.S. Naval Research Laboratory, Houston Lighting and Power Company, Texas Department of Parks and Wildlife, U.S. Coast Guard, U.S. Army Corp of Engineers, and Texas A&M University. Participants are aided in the study by Tracor and Lockheed Electronics Company. A team from Michigan State University will aid in the August observation program.

NASA aircraft of MSC's earth observations program beginning Monday will fly over the area of Cedar Bayou near the cooling water outlet of the Houston Lighting and Power Company's Cedar Bayou plant.

Due to a shutdown of the Cedar Bayou plant during this period the August observational program will provide perhaps the last opportunity to observe the bay in its unaffected state. This will provide a data base for comparison to observations taken later during plant operation. These

observations will also provide data to be used in tests of hydrodynamic models of the bay in its unaffected state.

The pace of the observational program will gradually build from the use of a single vessel and ground transit team on Monday to the use of eight surface vessels, a ground meteorological station, a ground transit team, a helicopter, and a remote sensing equipped aircraft on Thursday. Temperature, salinity, turbidity and water velocity will be measured. In addition to using drogues and current meters to measure water velocity a non-toxic fluorescent dye (Rhodemine WT) will be used in the determination of both currents and the diffusion properties of the bay. This red-orange dye is harmless to aquatic life and is expected to diffuse to the extent it is no longer visible within 30 minutes of release. The dye will be detectable in minute quantities by fluoroscopes aboard two of the surface vessels for up to 2 hours after release.

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PUBLIC INFORMATION OFFICE HOUSTON, TEXAS 77058

713/483-5111



news

MSC 71-54

August 4, 1971

The National Aeronautics and Space Administration - Manned Spacecraft Center and the Clear Lake City Water Authority jointly announced
today that they are entering into detailed discussions leading to a long
term contract whereby the Clear Lake City Water Authority would previde treatment of MSC's wastewater. The Clear Lake City Water Authority's
treatment facility is located approximately 300 feet from the MSC boundary,
and a pipeline would be built between the two facilities. MSC has initiated
a contract to provide for its connecting pipeline plans and specifications.

In August 1970, the Texas Water Quality Board issued Order No. 69-9A which will require all Clear Lake waste dischargers to either divert effluent from Clear Lake, or to upgrade treatment of effluent by August 1972. In addition, the President, through Executive Order 11507 dated February 5, 1970, notified federal installations of a requirement to meet more stringent effluent standards. As a result, MSC had initiated plans to upgrade its sewage treatment facilities. However, in March 1971, the Clear Lake City Water Authority proposed that it provide the advanced treatment of MSC wastewater as required by the Texas Water Quality Board and the Environmental Protection Agency.

Add 1 MSC 71-54

Both federal and state pollution regulatory agencies have endorsed the Clear Lake City Water Authority proposal and recommend the expanded use of municipal or regional facilities for the purpose of reducing water pollution. A stated long range goal of the Texas Water Quality Board is to ultimately divert all effluent from Clear Lake and the proposed contract between MSC and the Clear Lake City Water Authority will facilitate the accomplishment of this goal.

Even though MSC must install a connecting pipeline, there will be a considerable cost savings by not having to improve the existing MSC treatment facilities. It is also anticipated, because of a higher processing volume, that the operating costs to jointly process MSC and Clear Lake City wastewater will be significantly less than if each proceeded on an independent basis.

The Clear Lake City Water Authority has initiated a plan to meet the more stringent effluent standards by upgrading its treatment facility. The new treatment process will be operational by the deadline of August 1972.

Matching federal and state funds have been requested to finance this project.

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PUBLIC INFORMATION OFFICE HOUSTON, TEXAS 77058

713/483-5111



news

MSC 71-55

August 10, 1971

HOUSTON, TEXAS--The National Aeronautics and Space Administration has selected Boeing Co. (Space Division) Houston and G.E. (Apollo Systems) Houston for competitive negotiations leading to final selection for the award of a contract which will provide reliability, quality assurance and flight safety engineering at the Manned Space-craft Center, Houston.

The contract will be for one year and will contain provisions for two additional one-year extensions.

Reliability and quality assurance engineering include quality assessments of spacecraft systems, reliability program support for equipment, providing a parts and materials data system for equipment, and assessment of flight readiness of spacecraft and related equipment.

Flight safety engineering includes analyses of operational procedures, plans and activities, evaluations of test requirements and test operations, and performance of flight readiness assessments.

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news

MSC 71-56

August 13, 1971

The National Aeronautics and Space Administration today named

Astronauts Eugene A. Cernan, Ronald E. Evans, and Harrison H. (Jack)

Schmitt as the prime crew for Apollo 17, the last scheduled lunar landing mission.

Backup crewmen are Astronauts David R. Scott, Alfred M. Worden, and James B. Irwin, who recently completed the Apollo 15 mission.

Cernan, commander, and Schmitt, lunar module pilot, will explore the lunar surface, while Evans, command module pilot, conducts extensive scientific experiments in lunar orbit.

Schmitt, who has a Ph. D. degree in geology, will be the third holder of a doctorate to land on the moon. Astronauts Edwin E. Aldrin, Jr. and Edgar D. Mitchell, lunar module pilots of Apollos 11 and 14, respectively, have Doctor of Science degrees.

Apollo 17 is scheduled for launch in December 1972. Final choice of the landing site has not yet been made. The 12-day mission will continue the amphasis on both lunar surface and lunar orbital science.

Lunar surface stay time will be up to 68 hours, and three exploration periods of up to 7 hours each are planned. A Lunar Roving Vehicle will be used, and an Apollo Lunar Surface Experiments Package will be deployed. Mapping of the moon and several scientific experiments will be continued from lunar orbit. Evans will leave the spacecraft to retrieve film from cameras in the service module during the trip back to earth.

Cernan, 39, a Navy Captain, has accumulated 264 1/2 hours in space aboard Gemini 9 and Apollo 10. On his Gemini 9 extravehicular activity, he became the first man to stay outside a spacecraft for a full revolution of the earth. During Apollo 10, he and Colonel Thomas P. Stafford descended to within 8 miles of the lunar surface for the final checkout of the Apollo spacecraft before the first manned lunar landing. Cernan is married and has one daughter.

Evans, 37, a Navy Commander, has not yet flown in space. He was backup command module pilot for Apollo 14 and served on support crews for Apollos 7 and 11. Evans is married and has a daughter and a son.

Schmitt, 36, is a civilian. Apollo 17 will be his first space flight. He was backup lunar module pilot for Apollo 15 and has been involved in geology training for all lunar landing mission crews. Schmitt is single.

PUBLIC INFORMATION OFFICE HOUSTON, TEXAS 77058

713/483-5111



news

August 13, 1971

MSC 71158

HOUSTON, TEXAS -- The Manned Spacecraft Center today notified 132 Civil Service employees they will be released as a result of manpower reductions of the National Aeronautics and Space Administration.

resign or retire. An additional 69 employees were informed they will be reassigned or placed in jobs at a lower grade.

The move is to be concluded by October 3, and it will reduce the MSC work force to approximately 4,000 Civil Service personnel. By June 30, 1972, the work force will be further reduced by attrition to 3,935.

While some 212 positions are to be eliminated by next June, the number of employees being separated now is smaller because of resignations and retirements, a spokesman in the Personnel Division said.

A year ago during MSC's first forced reduction of Civil Service employees, 175 persons were released and an additional 185 workers were reassigned or placed in jobs at a lower grade.

Among the 132 employees scheduled to leave are 70 engineers and scientists and technicians. Most of them are stationed at the Center, although 34 have jobs in field operations of the Center at Downey, California, Bethpage, New York, and Kennedy Space Center, Florida,

The engineers and technicians have backgrounds in electronics, quality assurance, electrical and mechanical engineering and mechanical equipment.

Administrative professionals in the fields of contract administration, logistics, audio visual aids, and general administration also are affected.

MSC has set up an Outplacement Center for the affected workers and has invited other Government agencies and business concerns to interview them.

MSC Director Robert R. Gilruth told the RIFed employees, "I have directed the Personnel Officer to place the highest priority on assisting you and others who are adversely affected. Everything possible will be done to help you secure other employment."

Working closely with the Houston Chamber of Commerce and the Texas
Employment Commission, 350 firms in the Houston area have been contacted
and invited to interview the employees who would like to remain in the
area.

Organizations wishing to review employee resumes or desiring to interview MSC employees for job openings are urged to contact Stan Goldstein, NASA Manned Spacecraft Center, Houston, Texas, telephone (713) 483-3486.

PUBLIC INFORMATION OFFICE HOUSTON, TEXAS 77058

713/483-5111



news

August 23, 1971

MSC 71-59

HOUSTON, TEXAS--Scientists from Columbia University's Lamont-Doherty Geological Observatory, using thermometers implanted in the lunar surface by the Apollo 15 astronauts, have successfully measured the temperature gradient beneath the lunar surface -- a first step in understanding how the moon produces and gives up its heat.

Dr. Marcus G. Langseth, Jr., Principal Investigator for the Apollo 15 heat flow experiment, and Dr. John L. Chute, Jr., co-investigator, reported measurements from the experiment show the temperature of material near the lunar surface increases at the rate of about nine degrees Fahrenheit for each ten feet of depth.

This increase of temmerature with depth is believed related to the outward flow of heat from a warmer lunar interior.

Tonight, at midnight, scientists at the NASA Manned Spacecraft Center, Houston, will send radio commands to the experiment on the moon, turning on heaters which will determine the conductivity of material in which the thermometers are emplaced. Once the thermal conductivity (the efficiency with which a material conducts heat) of the moon has been established it becomes possible to combine this information with the temperature gradient and to calculate the rate at which heat is flowing from the moon. This in turn indicates the total heat produced by the moon and is related to the moon's interior temperature. From information on the total heat production of the

moon, conclusions can be drawn on the abundance of long-lived radioactive isotopes which usually are a major source of heat energy and which are related to the bulk composition of the moon.

Astronauts David R. Scott and James B. Irwin emplaced the temperature sensors, part of the Apollo Lunar Surface Experiments Package (ALSEP) during the first and second of three periods of exploration which they conducted at the moon's Apennine mountain front at Hadley Rille.

The sensors were placed in two holes which the astronauts drilled about five-and-a-half feet into the lunar surface and were encased in the hollow drill stems.

The bottom-most thermometer, 57 inches below the surface, has stabilized at a temperature of four degrees below zero Fahrenheit. Temperature differences between four thermometers in the bottom 20 inches of the hole were used to calculate a temperature gradient for the lunar surface material.

Active measurements of the surface material's conductivity will be made up until lunar sunset September 12.

PUBLIC INFORMATION OFFICE HOUSTON, TEXAS 77058

713/483-5111



news

MSC 71-60

August 25, 1971

HOUSTON, TEXAS -- A Career Guidance Seminar, sponsored by the Manned Spacecraft Center's Outplacement Center, is being held today for employees affected by the reduction in force.

Participants will be given information concerning the state of the job market, jobs available, typical salary levels and current economic trends.

Included in the agenda is a panel discussion, small group discussions to answer specific questions, registration for scientific and engineering job leads, and an explanation of how to file for unemployment insurance.

Techniques for preparing a resume also will be covered.

Conducting the seminar are the Texas Employment Commission and the University of Houston Center for Human Resources.

PUBLIC INFORMATION OFFICE HOUSTON, TEXAS 77058

713/483-5111



news

August 26, 1971

MSC 71-61

HOUSTON, TEXAS--The National Aeronautics and Space Administration has asked aerospace firms for proposals to study an Atmospheric Science Facility which could be placed in Earth orbit by a Space Shuttle.

The request was issued by NASA's Manned Spacecraft Center.

In its instructions to industry, MSC calls out four study tasks.
They are:

- 1. Scientific study
- 2. Spectrometer design study
- 3. Design study of telescope and pointing controls
- 4. Presentation of findings

The objectives of the study are to define the preliminary requirements for a general purpose Ultra-Violet (UV) to Infrared (IR).

Laboratory which could study Earth's atmosphere, comets, other planets and the phenomena caused by the Sun.

Wooden mockups of UV and IR spectrometers and of a telescope mirror also are called for in the proposal.

The proposal calls for a firm fixed price contract. Bidders are to submit plans by August 30 and the work will be concluded approximately 12 months after contract award.

PUBLIC INFORMATION OFFICE HOUSTON, TEXAS 77058

713/483-5111



news

MSC 71-62

September 1, 1971

HOUSTON, TEXAS -- A "Workshop for a Prospective Owner of a New Business," is to be conducted September 2 for all civil service employees affected by the recent reduction in force.

Sponsoring the session is the Manned Spacecraft Center's Outplacement Office. The day-long meeting will be held at Ellington Air Force Base.

The program is designed to acquaint people who may wish to begin a new business with certain techniques necessary to enhance their chances for success.

Speakers during the day will include the Management Assistance
Officer and the Houston District Director of the Small Business
Administration and members of the Service Corps of Retired Executives.

No admission will be charged, but a reservation is required.

PUBLIC INFORMATION OFFICE HOUSTON, TEXAS 77058





news

MSC 71-63

September 3, 1971

HOUSTON, TEXAS--Dr. Gene Simmons, Chief Scientist at NASA's
Manned Spacecraft Center, Houston is returning to the Massachusetts
Institute of Technology, Cambridge, where he will resume his position
as Professor of Geophysics.

Dr. Simmons has served as Chief Scientist at the Houston Center since October 1969. He was named to the post by MSC Director Robert . R. Gilruth.

In accepting the appointment at MSC, Dr. Simmons said he intended to maintain his ties with MIT and, because of academic commitments, would spend only a portion of his time here.

Dr. Gilruth said he was sorry to see Dr. Simmons leave the Manned Spacecraft Center even though it was understood at the time he accepted the appointment that his stay would be limited.

"I am sure Dr. Simmons' background in lunar studies and his knowledge of the Apollo lunar sample program will continue to be of benefit to us," Dr. Gilruth said.

Dr. Simmons, a native of Carrollton, Texas was Professor of Geophysics at MIT for four years prior to joining NASA. He is a graduate of Texas A&M, and received his masters degree at Southern Methodist University and his doctorate at Harvard University.

PUBLIC INFORMATION OFFICE HOUSTON, TEXAS 77058

713/483-5111



news

September 8, 1971

MSC 71-66

HOUSTON, TEXAS--Skylab's Apollo Telescope Mount (ATM) prototype arrived at the NASA Manned Spacecraft Center today where it will undergo extensive thermal vacuum testing.

The 22,000 pound ATM was flown from Marshall Space Flight Center, Huntsville, Alabama to Ellington Air Force Base aboard the Super Guppy aircraft. The ATM was transferred to MSC where it will undergo alignment verification in Building 36 clean room prior to the vacuum chamber tests which will simulate the harsh environment of space.

The Skylab ATM is a solar observatory which will operate from earth orbit and will give scientists views of the Sun undistorted by the earth's atmosphere. The Skylab cluster consisting of the ATM, airlock module, docking adapter and workshop is scheduled for launch during the second quarter of 1973 and will be visited by three separate three-man crews for durations of 28 to 56 days.

The ATM, following alignment verification, will be transported to Chamber A of the Space Environmental Simulation Laboratory, Building 32, where thermal vacuum tests are scheduled to begin on October 11.

Prior to the start of the thermal tests, an abbreviated systems test will be performed to verify the operation of all ATM systems.

These operations will be controlled from the Control and Display panels, identical to the actual controls which the Skylab astronauts will operate during flight.

The control and display panels will be located in a man-lock on the third level of Chamber A. Test crews will operate the controls and ATM system functions will be monitored by the automatic checkout equipment (ACE) in Building 32. This test, which is set to start on September 30, will be conducted while the man-lock is maintained at Skylab cabin pressure.

Two major thermal vacuum tests are scheduled. The first which begins October 11 will last five days and the second, scheduled to start on November 4, will last about 18 days. All tests will be operated around-the-clock.

Upon conclusion of the tests, the ATM prototype will be transferred to the Building 36 clean room for post-test alignment verification and then returned to Marshall.

The ATM tests at MSC follow quality and reliability assurance checkouts which were concluded late in August at the Marchall center.

A Marshall checkout team will work with MSC personnel in the champer tests.

The ATM flight unit, which is being fabricated at the Marshall Center, will undergo similar thermal vacuum chamber tests at MSC in May 1972. The ATM prototype is the backup flight item for Skylab.

PUBLIC INFORMATION OFFICE HOUSTON, TEXAS 77058

713/483-5111



news

Sptember 13, 1971

MSC 71-67

HOUSTON, TEXAS--The National Aeronautics and Space Administration has signed a supplemental agreement with the Grumman Aerospace Corp., valued at about \$4,364,849 for changes in the Apollo Lunar Module Contract NAS 9-1100.

The agreement formally incorporated into the Grumman contract four changes previously authorized by NASA for modification to the Contractor's procedures for: LM Ascent Engine Recontoured Thrust Chamber; Extension of Simulation Effort (FMES/FCI); Modifications to the Exterior Tracking Light; and the Use of LM-8 for Testing in Support of LM-5. The modifications bring the estimated value of the Grumman contract since January 1963 to approximately \$1,778,034,399.

Grumman performs the majority of work on the Lunar Module Contract at its Bethpage, New York facility with support from its field offices in Houston, White Sands, and at the Kennedy Space Center.

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PUBLIC INFORMATION OFFICE HOUSTON, TEXAS 77058

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news

September 13, 1971

MSC 71-68

HOUSTON, TEXAS--The National Aeronautics and Space Administration has selected the Boeing Company (Space Division), Houston, for award of a contract to provide reliability, quality assurance, and flight safety engineering at the Manned Spacecraft Center, Houston. Boeing was selected following completion of competitive negotiations.

Estimated cost of the one year, cost-plus-fixed-fee contract is approximately \$4.3 million. The contract will be effective November 1.

Reliability and quality assurance engineering includes quality assessments of spacecraft systems, reliability program support for equipment, providing a parts and materials data system for equipment, and assessment of flight readiness of spacecraft and related equipment.

Flight safety engineering includes analyses of operational procedures, plans and activities, evaluations of test requirements and test operations, and performance of flight readiness assessments.

PUBLIC INFORMATION OFFICE HOUSTON, TEXAS 77058

713/483-5111



news

September 17, 1971

MSC 71-70

HOUSTON, TEXAS--A series of cold weather environment tests on the performance of the Skylab command module (CM) postlanding and recovery systems got underway this week at the Climatic Laboratory, Eglin AFB, Florida.

Skylab flights scheduled to begin in early 1973 will cover a much greater percentage of the Earth's surface than previous programs since the missions will be launched on a 50-degree inclination.

The ground track will cover an area as far north as Winnipeg,

Canada and the southern tip of England and will cover all the southern

hemisphere land masses except the southernmost tip of South America.

In several months of the year the area over which the spacecraft passes includes conditions considerably colder than heretofore experienced. There is a remote possibility that an emergency or major system malfunction during launch or orbit phases could force the spacecraft to land in these areas.

To prepare for the possibility of a contingency recovery in a cold region, it was considered necessary to determine the cold weather limitations of the combined crew and command module. The purpose of the tests at Eglin is to determine these limits.

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The current series of tests at Eglin AFB will be in a chamber/ water tank environment with a water temperature of 33 degrees and an air temperature of 25 degrees.

Objectives of the tests series will be to determine the performance characteristics and limitations of Skylab CM postlanding systems in a cold weather environment, determine the CM test crew response to the cold as well as the interior environmental conditions of the CM. The extent of ice buildup on the CM exterior and effect of ice on the systems performance will also be determined.

The test vehicle to be used in the Skylab cold weather test program is CM-007A which has been used for qualifying Apollo postlanding systems and equipment for flight since 1966. The postlanding and recovery systems on CM-007A are completely representative of the actual Skylab CM systems. The interior configuration is very similar to Skylab in a postlanding condition.

The test program is in two phases. A minimum of three 12-hour manned tests with each successive test conducted in slightly more severe conditions. Each test will begin with Stable II (apex down) and end with a Stable I (CM upright) egress by the test subjects. The manned portion will be concluded with a 24-hour test to examine manned CM performance under conditions derived from the results of the 12-hour tests.

Add 2 MSC 71-70

The second and concluding phase of the program at Eglin will be completed by the end of this month with an unmanned open-end test not to exceed 72 hours conducted under environmental conditions derived from results of the manned tests. The CM systems will be Skylab battery powered and cycled remotely simulating a 72-hour postlanding period.

Engineers from the Manned Spacecraft Center Recovery Operations
Branch will conduct and monitor the tests at Eglin. The MSC Medical
Operations Division and Technical Services Division will support the
test program at Eglin. The Aerospace Rescue and Recovery Service at
Eglin AFB will supply pararescue personnel for the tests.

PUBLIC INFORMATION OFFICE HOUSTON, TEXAS 77058





news

MSC 71-71

September 24, 1971

HOUSTON, TEXAS--October 6 marks the beginning of the Manned Spacecraft Center's second year of special space-science programs for school groups.

Lecture demonstrations and question and answer sessions will be presented at the Center throughout the school year to acquaint students with space-science concepts, applications, major accomplishments, and future objectives.

The programs begin at 10:00 a.m. and last for two hours on the following schedule:

Grades 1-3

1st Tuesday of each month

Grades 4-6

1st and 3rd Wednesdays of each month

Grades 7-12

2nd and 4th Wednesdays of each month

After the presentation, students may view exhibits and artifacts of manned space flight which are on display in the Visitor Orientation Center. An optional self-guided tour through several operational facilities is also available.

Last year over 19,000 students participated in the program, including a group of deaf children who came with their own interpreter. School groups traveled to the Center from all over Texas and from as far away as Oklahoma, Louisiana, and Arkansas.

'For reservations, write to the Manned Spacecraft Center, Special Events Office, Code AP5, Houston, Texas 77058, or call 713/483-4321.

PUBLIC INFORMATION OFFICE HOUSTON, TEXAS 77058

713/483-5111



news

MSC 71-72

September 28, 1971

HOUSTON, TEXAS--Tests to determine the cause of the Apollo 15 parachute failure have been concluded with two items still listed as candidates.

They are the fuel dump, which expelled approximately six pounds of monomethyl hydrazine (MMH) from the command module reaction control system, and the links which connect the suspension lines to the risers.

Apollo Spacecraft Program officials doubt that the exact cause can be determined, but corrective action will be taken on both effective with Apollo 16.

Tests have shown that MMH being dumped through a hot engine can result in tongues of flame from the thrusters which could affect parachute lines. Remaining fuel or oxidizer (nitrogen tetroxide) has been dumped shortly after main chute deployment. The dump will be eliminated in future missions, and the spacecraft will land with residual propellants aboard.

Flaws were detected in links on the one Apollo 15 parachute recovered. The parachute which failed was not recovered, but the possibility exists that enough of the links could have failed on it to permit collapse. The origin or cause of these flaws is not understood at this time. For this reason, the material for the links

MSC 71-72

will be changed. The links have been constructed of 4130 steel. Future links will be of Inconel, a nickel/steel alloy.

Tests eliminated the apex cover, or forward heat shield, as a reason for the collapse of one of the three parachutes during the Apollo 15 landing.

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PUBLIC INFORMATION OFFICE HOUSTON, TEXAS 77058

713/483-5111



news

MSC 71-74

October 1, 1971

HOUSTON, TEXAS--NASA astronauts are today taste-testing the food scheduled to be aboard for the 28 and 56-day long Skylab missions in 1973.

More than 15 astronauts are taking part in the food compatibility test which began last week at the NASA Manned Spacecraft Center. The food test calls for the astronauts to eat three specially prepared meals a day for five days and then record on a score sheet his comments—good, bad or indifferent on each food item.

Purpose of the test, according to Dr. Malcolm Smith, Chief of the Food and Nutrition at the Manned Spacecraft Center, is to evaluate proposed Skylab food items, determine astronauts' preference and most importantly determine individual astronaut energy requirements. In addition to evaluating many of the items already selected for Skylab, the astronauts are being asked to evaluate and comment on new food items being considered for use aboard Skylab. The test is being conducted in the MSC Life Systems Laboratory where the meals are planmed and prepared by dieticians and food technologists in the food laboratory and served to the astronauts.

Technology, Inc., a contractor at MSC, is coordinating the food and compatibility tests and other food related programs.

"It is important that we know each man's energy requirements," said Dr. Smith. "These tests will provide the data necessary in the selection of not only the food the astronaut prefers but the items which will furnish the requirements for Skylab crew members."

"Energy (food) is weight and weight is critical on the spacecraft, Dr. Smith explained. He estimates approximately 2,000 pounds of food

and packaging and about 6,000 pounds of water will be required for the three manned Skylab missions. "If we over estimate the energy requirements (food) the weight would be excessive," he stated.

"Success of Skylab medical experiments is influenced by the nature and amount of food the astronauts consume," Dr. Smith said. One of the experiments, Nutrition and Musculoskeltal Function, demands on the precise knowledge of nutrient and mineral intake.

The food compatibility tests start with breakfast at 7:45 a.m. A recent breakfast menu consisted of orange juice, scrambled eggs, coffee and peach ambrosia. A sampling of the astronaut evaluations showed comments ranging from "like very much" or "like slightly" and "dislike moderately."

A luncheon meal consisted of tomato soup, cheese crackers, chicken and rice; ham salad spread, biscuits, pineapple tidbits and grape drink. The evening meal is packaged for the astronauts who take it home where it is eaten in a family atmosphere. All uneaten food must be returned to the food laboratory.

Each astronaut taking part in the food test is weighed prior to serving and all uneaten food is weighed.

During the food test meals are served in a mockup of the Skylab food tray. In flight the Skylab tray which is $13\frac{1}{2}$ inches by 15 inches by $4\frac{1}{2}$ inches thick has individual recessed compartments into which the canned food items are placed for heating. A flip of a switch and built in heating elements will heat the canned food.

Astronauts taking part in the test are: Vance Brand, Karol Bobko, Gerald Carr, Robert Crippen, Owen Garriott, Edward Gibson, Joe Kerwin, Don Lind, Jack Lousma, Bruce McCandless, Story Musgrave and Bill Pogue. Other astronauts will be scheduled for the final week of the test.

Donald K. (Deke) Slayton, Director of Flight Crew Operations;
Thomas P. Stafford, Deputy Director of Flight Crew Operations; Kenneth S. Kleinknecht, Manager, Skylab Program Office and Clifford E. Charlesworth, Deputy Manager, Skylab Program Office are also taking part in the test.

When the test is concluded within the next week, researchers at the Manned Spacecraft Center will have the information necessary to prepare the most palatable menu ever taken into space. The data gathered from the tests will be also used in determining the food which will be available for the 56-day three man altitude chamber test scheduled for June 1972. The chamber test, designed to obtain medical data and medical experiment equipment evaluation for Skylab, will be conducted in the 20-foot altitude chamber in the Life Systems Laboratory.

A sample menu used during the test:

Breakfast

Grapefruit Juice Scrambled Eggs Rice Krispies Biscuit and Jam Coffee

Lunch

Turkey Rice Soup Spaghetti and Meat Tuna Salad Spread White Bread Strawberries Tea

Dinner

Shrimp Cocktail
Filet Mignon
Sweet Potatoes
Creamed Peas
Peach Ambrosia
Orange Drink, Coffee

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(Photos available: 'S-71-50755 and S-71-50756)

PUBLIC INFORMATION OFFICE HOUSTON, TEXAS 77058





news
October 4, 1971

MSC 71-75

HOUSTON, TEXAS...NASA Administrator James C. Fletcher will present awards Tuesday, October 5, to NASA employees and contractors for outstanding contributions to the Apollo 15 mission.

The ceremony will honor those people whose contributions were so important to the success of the Apollo flight. It will be held in the Main Auditorium of the Manned Spacecraft Center beginning at 1:30 p.m.

Assisting Dr. Fletcher will be George M. Low, Deputy Administrator.

MSC Deputy Director Christopher C. Kraft, Jr., will be master of ceremonies

and will read the citation. The Apollo 15 crew also will participate.

Five scientists will receive the agency's NASA Exceptional Scientific Achievement Medal "for scientific accomplishments" in the Apollo 15 mission. Recipients of the award will be Dr. Larry A. Haskin, University of Wisconsin; Dr. Leon T. Silver, California Institute of Technology; Dr. Gordon A. Swann; United States Geological Survey; Dr. Robert O. Pepin, University of Minnesota, and Dr. Gene Simmons, formerly the Chief Scientist at the Manned Spacecraft Center now with the Massachusetts institute of Technology.

Twenty two NASA employees will receive NASA Exceptional Service Medals in recognition of "their outstanding contributions to this nation's manned space flight program."

NASA Group Achievement Awards will be presented to the Lunar Traverse Planning Team; the Lunar Orbit Experiments Team; the Extravehicular Mobility Unit Team; the Television and Lunar Communications Relay Unit Team—all of MSC, the Lunar Roving Vehicle Team, composed of members assigned to the Marshall Space Flight Center, Huntsville, Alabama and MSC, and to the Space flight Meteorology Group of the National Oceanic and Atmospheric Administration assigned to the Kennedy Space Center, Florida.

NASA Public Service Awards will go to four aerospace industry contractors for their contributions to the flight. Recipients are Earl R. Houtz, The Boeing Company, Samuel Ramano, Delco Electronics; Edward P. Smith, North American Rockwell Corporation, and Donald J. Markarian, Grumman Aerospace Corporation.

PUBLIC INFORMATION OFFICE HOUSTON, TEXAS 77058

713/483-5111



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October 5, 1971

HOUSTON, TEXAS--Gerald D. Griffin, formerly of Athens, Texas but now employed by the National Aeronautics and Space Administration's Manned Spacecraft Center, was awarded the NASA Exceptional Services.

Medal for his contributions to the successful Apollo 15 mission.

His gold imprinted certificate reads:

To Gerald D. Griffin, in recognition of his outstanding contributions to the success of the Apollo 15 mission: the long list of accomplish ments of this scientific expedition included the first use of the improved spaces. Craft, the lunar roving vehicle, remote control television, expanded as communications, enhanced crew mobility, and the first deep space extravely vehicular activity.

"This extraordinary lunar exploration produced vast and unque additions to our store of scientific data from inflight observations as well as from the lunar surface, and accomplished all of the planred scientific and engineering objectives."

Along with his certificate, he received a medal with wreath, rosette and NASA insignia imprinted across its face.

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The awards were made in Houston on October 5, by NASA Administrator James C. Fletcher. Assisting Dr. Fletcher were George M.; E. Low. Deputy Administrator; Christopher C. Kraft, Jr., Deputy Director at the Manned Spacecraft Center; and the crew of Apollo 15.

Twenty-two other NASA employees, five scientists, four aerospace industry contractors, and six organizations were also honored.

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Releases typed for:
Donald M Corcoran
George C. Franklin
Jesse F. Goree, Jr.
Olin L. Graham
Gerald D. Griffin
Enoch M Jones
Ronald W Kubicki
Charles C. Lutz
Chris D. Perner
Richard L. Sinderson, Jr
Harley L. Stutesman, Jr.
Donald G. Wiseman

PUBLIC INFORMATION OFFICE HOUSTON, TEXAS 77058

713/483-5111



news

MSC 71-78

October 13, 1971

HOUSTON, TEXAS--A joint experiment conducted by the National Aeronautics and Space Administration (NASA) and the U. S. Department of Agriculture (USDA) to gather information on southern corn leaf blight from aircraft has been completed and the data are being analyzed.

Preliminary results show the blight can be detected and its progress monitored by sensor bearing aircraft. Although southern corn leaf blight was not as severe as projected, the presence of such a widespread infestation provided a unique opportunity to assess remote sensing as a tool for large-scale crop surveys. The technique offers promise in providing quick and accurate surveys of large areas of farmland from aircraft or spacecraft.

Color infra-red photography taken by a U. S. Air Force RB-57F aircraft and multi-spectral electronic data recorded by a University of Michigan C-47 aircraft, both under contract to MSC, were used in the experiment to determine how well crop diseases such as corn leaf blight can be detected from high-flying aircraft or spacecraft.

The Air Force RB-57 collected color infra-red photography of more than 72,000 square kilometers (45,000 square miles) of America's richest corn country in the states of Ohio, Illinois, Iowa, Indiana, Missouri, Michigan and Nebraska during the corn growing season June through September. This photography was supplemented by electronic data collected by the C-47 covering about 6,720 square kilometers (4,200 square miles) in an intensive study area in Indiana.

During the four month study, information collected by the aircraft was compared periodically with data collected on the ground in a group of sample fields which were selected in advance for detailed study and observation. Personnel from federal and state agricultural agencies responsible for the ground watch phase of the program made plant-by-plant inspections of corn on these sites at about two-week intervals.

Simultaneously with ground studies, the same areas were photographed from the RB-57 flying at an altitude of about 60,000 feet. These photographs, along with ground study data were then sent to a photo-interpretation team at Purdue University's Laboratory for Application of Remote Sensing, Lafayette, Indiana. This team, headed by R. B MacDonald, analyzed the photography and compared results with those obtained by state and federal field personnel to determine the effectiveness of using remote sensing from high altitude aircraft to monitor the development and spread of corn blight, assess the levels of infection, and determine the probable impact of the blight on crop production.

MacDonald said the study, involving close cooperation among three government agencies and two universities, showed that corn blight could be detected and its progress tracked from high-flying aircraft. He said analysis of infrared photography taken by the RB-57 showed three levels of infestation beginning with the early to middle phase of infection.

The USDA and NASA are analyzing results of the experiment in detail not only to determine the usefulness of crop infestation surveys, but for many other agricultural applications such surveys promise. It is expected results of the analysis will be announced within the next few months.

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PUBLIC INFORMATION OFFICE HOUSTON, TEXAS 77058

713/483-5111



news

MSC 71-80

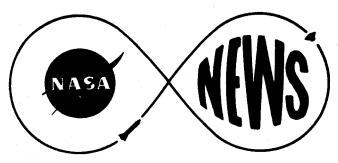
October 20, 1971

HOUSTON, TEXAS--The National Aeronautics and Space Administration has signed a Supplemental Agreement with the Grumman Aerospace Corporation valued at about \$195,400,000 for changes in the Apollo Lunar Module contract.

The agreement formally incorporates into the Grumman contract changes previously authorized by NASA for modifications to the Lunar Module vehicles which includes: increased lunar staytime, increased Lunar Module surface payload, increased extravehicular activity support, increased lunar sample return capability, increased Lunar Module hover time and associated delivery schedule adjustment for the lunar landing missions through Apollo 17.

The modifications bring the total estimated value of the Grumman contract since January 1963 to approximately \$1,973,475,391. Grumman performs the majority of work on the Lunar Module contract at its Bethpage, New York facility with support from its field offices in Houston, White Sands and at the Kennedy Space Center.

The contract is managed by the NASA Manned Spacecraft Center, Houston.



NATIONAL AERONAUTICS AND SPACE ADMINISTRATION

Manned Spacecraft Center Houston, Texas 77058

FOR RELEASE: 11/15/71

Don J. Green (713/483-5111)

RELEASE NO: 71-82

PROPULSION SYSTEMS STUDY

The National Aeronautics and Space Administration today asked aerospace firms for proposals to develop and test polymer seal materials for application in Space Shuttle propulsion's systems.

The request was issued by NASA's Manned Spacecraft Center.

In its instructions to industry, MSC notes that although strides have been made in improving seals and seal materials, leakage continues to be one of the primary problems where liquid rocket propulsion systems are used.

Four materials are candidates for additional evaluation. They are HYSTL and Viton A, for use with liquid hydrogen, and polymers identified as AFE-124D and Teflon TFE, for use with liquid oxygen as well as liquid hydrogen.

The Shuttle will be used to transport personnel and cargo into low Earth orbit. Concepts call for an airplane-like Orbiter to be launched vertically on a Booster in a piggy-back arrangement. They will separate at approximately 60, 900 meters (200, 000 feet) altitude.

Studies call for the Booster to be recovered, refurbished and used again. The sleek Orbiter continues on into space where it will conduct scientific studies for up to seven days. Upon returning to Earth, it will land horizontally like present-day jet aircraft.

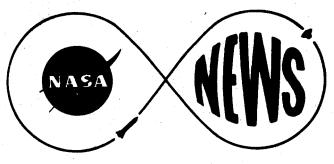
The proposal calls for a fixed-price research and development contract. Proposals are to be submitted by December 3 and the work will be concluded approximately 12 months after contract award.

MSC has allotted approximately \$100,000 for the performance of the contemplated contract.

The work will be conducted under direction of Propulsion and Power Division.

- end -

November 15, 1971



NATIONAL AERONAUTICS AND SPACE ADMINISTRATION

Manned Spacecraft Center Houston, Texas 77058

FOR RELEASE: UPON

RECEIPT

Don J. Green (713-483-5111)

RELEASE NO: 71-83

EVA/IVA STUDY

Ten aerospace-associated firms have been invited by the NASA Manned Spacecraft Center to submit proposals to study space walking requirements as they might pertain to the Space Shuttle.

The proposal calls for the contractor to investigate emergency, contingency and normal Extra Vehicular and Intra Vehicular Activities (EVA/IVA) -- synonyms for traverses by astronauts while outside Earth's atmosphere.

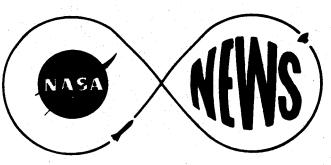
MSC told contractors that EVA's and IVA's probably will be necessary to support Shuttle operations. The contractors also are asked to study protective equipment needed to perform EVA/IVA tasks.

The proposal calls for a firm fixed-price research and development contract. Approximately \$150,000 of research funds have been set aside for the contemplated work.

Proposals are to be submitted by December 6, and the study will be concluded approximately 10 months after contract award.

- end -

November 22, 1971



NATIONAL AERONAUTICS AND SPACE ADMINISTRATION

Manned Spacecraft Center Houston, Texas 77058

FOR RELEASE: 11/23/71

Milton Reim (713-483-5111)

RELEASE NO: 71-84

NEW DEPUTY FLIGHT DIRECTORS NAMED

Four deputy flight directors have been named and additional assignments given to the present flight directors, by the Flight Operations Directorate at the NASA Manned Spacecraft Center to provide the support needed for the extended missions that will be flown in the Skylab Program.

The four deputy flight directors are Neil B. Hutchinson, Charles R. Lewis, Donald R. Puddy, and Philip Shaffer, all currently members of the Flight Control Division. They will continue in their present organizational position and assume the additional responsibility of deputy flight director.

Eugene Kranz, Chief of the Flight Control Division, said, "In order to bring these four men up to speed as quickly as possible, our plan is to use two of them on each of the remaining Apollo flights, and to assign them specific responsibilities for Skylab."

Puddy and Shaffer will be assigned flight director responsibilities on the upcoming Apollo 16 flight and Hutchinson and Lewis will be assigned to similar duties for the Apollo 17 mission.

The Skylab Program objectives are to extend the duration of manned space flight and to carry out a broad spectrum of experimental investigations. Of particular importance are a series of experiments aimedat medical research, earth survey, solar astronomy, and selected scientific and manufacturing experiments. Skylab is an earth orbital program scheduled for flight in 1973. The launch of an unmanned workshop will be followed by three separate manned launches of 3-man crews using Apollo spacecraft. After docking with the previously launched workshop,

the crews will inhabit the assembly for up to 28 days on the first visit and up to 56 days on each of the other two visits.

Flight directors in the Apollo program are Kranz, M. P. (Pete) Frank, Gerald Griffin, Glynn Lunney, and Milton Windler. Lunney has been relieved of active flight director tasks for the present, in order to further concentrate on his activities with the United States - USSR compatable rendezvous and docking systems of manned spacecraft. Windler will assume a new assignment representing the Flight Control Division in the areas of Skylab Earth Resources Experiments Package (EREP) mission planning and preparation.

The flight directors for Apollo 16 and 17 will be Kranz, Griffin, and Frank. Lead flight director on 16 will be Frank and lead flight director on 17 will be Griffin.

Specific skylab speciality areas to be assigned to the flight directors and deputy flight directors are as follows: Puddy--Skylab 1 activation and console procedures; Shaffer--manned activation, deactivation and data priority; Lewis--Launch/rendezvous/entry, pad tests/schedules/training, flight plan/crew procedures, ground systems and mission rules; Hutchinson--corollary experiments; Griffin--biomed experiments; and Frank--Apollo Telescope Mount (ATM) experiments.

Hutchinson, 31, assistant chief of the CSM Systems Branch, was born in Portland, Oregon and received a BA degree in math and physics from the Willamette University in Salem, Oregon. He is married to the former Karen Zollman of Wichita, Kansas.

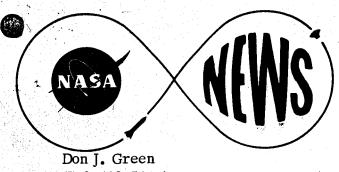
Lewis, 33, assistant chief of the Flight Control Operations Branch, was born in Lawton, Oklahoma, and received a BS degree in electrical engineering from New Mexico State University. He is married to the former Carolyn Cross of Lawton, Oklahoma, and they have two children, Anita, 11, and Keith, 9.

Puddy, 34, assistant Chief of the LM Systems Branch was born in Ponca City, Oklahoma, and received a BS degree in mechanical engineering from the University of Oklahoma. He is married to the former Dana Carol Timberlake of Ponca City, Oklahoma, and they have three children, Mike 12, Doug 8, and Glenn 6.

Shaffer, 35, assistant chief of the Flight Dynamics Branch was born in Beaver, Oklahoma, and received a BS degree in math from Panhandle State College in Goodwell, Oklahoma, He is single.

- end -

November 22, 1971



NATIONAL AERONAUTICS AND SPACE ADMINISTRATION

Manned Spacecraft Center Houston, Texas 77058

FOR RELEASE:

UPON

RECEIPT

(713-483-5111)

RELEASE NO: 71-85

GLYNN LUNNEY GOES TO MOSCOW

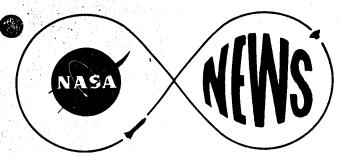
Glynn S. Lunney, an official of the Manned Spacecraft Center, formerly of Old Forge, Pennsylvania, has been named to the official party which meets with Soviet counterparts in Moscow, November 29 through December 7. The meeting is a continuation of technical discussions on the compatibility of rendezvous and docking of manned spacecraft.

These discussions are the third between the two countries on this subject. In late October 1970, five National Aeronautics and Space Administration representatives went to the USSR for preliminary talks, and a Soviet delegation visited the Houston space center this year from June 21 to 25.

Lunney is the Chief of the Flight Director's Office and has been with NASA since 1958. Prior to his present appointment, he was a Chief of the Flight Dynamics Branch and had several assignments as a Flight Director during Apollo missions.

Among his achievements are a NASA Outstanding Performance Award; the Lawrence Sperry Award from the American Institute of Aeronautics and Astronautics and several NASA Exceptional Service Medals.

Lunney has a Bachelor of Science degree in Aeronautical Engineering from the University of Detroit. He is married to the former Marilyn Jean Kurtz. They have four children and currently reside in Friendswood, Texas.



Don J. Green (713/483-5111)

RELEASE NO: 71-86

NATIONAL AERONAUTICS AND SPACE ADMINISTRATION

Manned Spacecraft Center Houston, Texas 77058

FOR RELEASE:

UPON

RECEIPT

MR. JOHNSON GOES TO MOSCOW

Caldwell C. Johnson, an official of the Manned Spacecraft Center, formerly of Hampton, Virginia, has been named to the official party which meets with Soviet counterparts in Moscow, November 29 through December 7. The meeting is a continuation of technical discussions on the compatibility of rendezvous and docking of manned spacecraft.

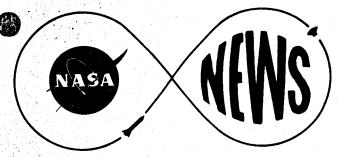
These discussions are the third between the two countries on this subject. In late October 1970, five National Aeronautics and Space Administration representatives went to the USSR for preliminary talks, and a Soviet delegation visited the Houston space center this year from June 21 to 25.

Johnson is Chief of the Spacecraft Design Office and has been with NASA and its predecessor, the National Advisory Committee for Aeronautics since 1939. As Chief of the Spacecraft Design Office, he has responsibility for study and design of future spacecraft and their systems.

Among his achievements are US patents for the Mercury Spacecraft; a patent for a One-Man Orbital Escape System, and a Manned Spacecraft Center Certificate of Commendation.

Johnson attended the University of Virginia. He is married and has two children.

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Don J. Green (713/483-5111)

RELEASE NO: 71-87

NATIONAL AERONAUTICS AND SPACE ADMINISTRATION

Manned Spacecraft Center Houston, Texas 77058

FOR RELEASE:

UPON

RELEASE

EDGAR LINEBERRY GOES TO MOSCOW

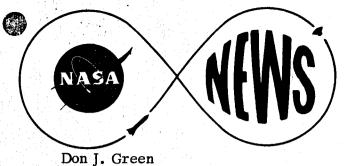
Edgar C. Lineberry, an official of the Manned Spacecraft Center, formerly of Jacksonville, North Carolina, has been named to the official party which meets with Soviet counterparts in Moscow, November 29 through December 7. The meeting is a continuation of technical discussions on the compatibility of rendezvous and docking of manned spacecraft.

These discussions are the third between the two countries on this subject. In late October 1970, five National Aeronautics and Space Administration representatives went to the USSR for preliminary talks, and a Soviet delegation visited the Houston space center this year from June 21 to 25.

Lineberry is the Chief of the Orbital Mission Analysis Branch and has been with NASA since 1959. His NASA career has been devoted exclusively to the development of guidance techniques for spacecraft. As Chief of the Orbital Branch, he is responsible for the detailed planning for the orbit phases of all manned missions. This includes planning for rendezvous phases, for abort, rescue and other contingency plans.

Among his achievements are the publication of more than a half dozen technical documents on spacecraft rendezvous, guidance and control.

Lineberry has a Bachelor of Science Degree in Mechanical Engineering and Aerospace Operations. He graduated from North Carolina State at Raleigh.



Manned Spacecraft Center Houston, Texas 77058

FOR RELEASE:

UPON

RECEIPT

Don J. Green (713/483-5111)

RELEASE NO: 71-88

DONALD CHEATHAM GOES TO MOSCOW

Donald C. Cheatham, an official of the Manned Spacecraft Center, formerly of Birmingham, Alabama, has been named to the official party which meets with Soviet counterparts in Moscow, November 29 through December 7. The meeting is a continuation of technical discussions on the compatibility of rendezvous and docking of manned spacecraft.

These discussions are the third between the two countries on this subject.

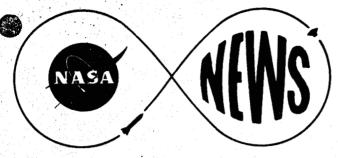
In late October 1970, five National Aeronautics and Space Administration representatives went to the USSR for preliminary talks, and a Soviet delegation visited the Houston space center this year from June 21 to 25.

Cheatham is the Assistant Chief of the MSC Guidance and Control Division and has been with NASA and its predecessor since 1947. Prior to his present appointment, he had several assignments in the spacecraft guidance field.

Among his achievements is honorary membership as an Associate Fellow in the American Institute of Aeronautics and Astronautics. He has also written numerous technical papers on guidance.

Cheatham has a Bachelor of Science degree in Aeronautical Engineering from Auburn University.

He is married to the former Frances Duncan. They have five children and currently reside in Seabrook, Texas.



Manned Spacecraft Center Houston, Texas 77058

FOR RELEASE:

UPON

RECEIPT

Don J. Green (713/483-5111)

RELEASE NO: 71-89

ROBERT SMYLIE GOES TO MOSCOW

Robert E. Smylie, an official of the Manned Spacecraft Center, formerly of Lincoln County, Mississippi, has been named to the official party which meets with Soviet counterparts in Moscow, November 29 through December 7. The meeting is a continuation of technical discussions on the compatibility of rendezvous and docking of manned spacecraft.

These discussions are the third between the two countries on this subject. In late October 1970, five National Aeronautics and Space Administration representatives went to the USSR for preliminary talks, and a Soviet delegation visited the Houston space center this year from June 21 to 25.

Smylie is the Chief of the Crew Systems Division and has been with NASA since 1962. Prior to his present appointment, he held assignments in the Project Mercury (one-man) space program.

Smylie has a Bachelor of Science degree; and a Master of Science degree in Mechanical Engineering. Both were earned at Mississippi State University. In addition, he has a Master of Science degree in Management from the Massachusetts Institute of Technology.

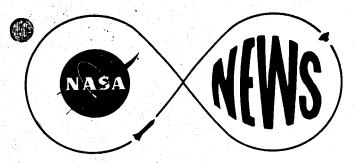
He has been awarded the NASA Exceptional Service Medal; attended MIT on a Sloan Fellowship, and in 1970, was elected Councilman to the City of El Lago, Texas.

As Chief of the MSC Crew Systems Division, Smylie is responsible for development of equipment that is vital in keeping astronauts alive.

Smylie is married to the former June Reeves of Carthage, Texas.

- end -

December 1, 1971



Manned Spacecraft Center Houston, Texas 77058

FOR RELEASE:

UPON

RECEIPT

Don J. Green (713-483/5111)

RELEASE NO: 71-90

DONALD WADE GOES TO MOSCOW

Donald C. Wade, an official of the Manned Spacecraft Center, formerly of San Antonio, Texas, has been named to the official party which meets with Soviet counterparts in Moscow, November 29 through December 7. The meeting is a continuation of technical discussions on the compatibility of rendezvous and docking of manned spacecraft.

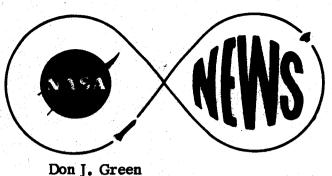
These discussions are the third between the two countries on this subject. In late October 1970, five National Aeronautics and Space Administration representatives went to the USSR for preliminary talks, and a Soviet delegation visited the Houston space center this year from June 21 to 25.

Wade is Chief of the Flight Loads Section, an office which is responsible for the peculiar problems associated with the transportation of goods and gear while in the gravity-free environment of space.

He is author of several technical papers and is a member of the American Institute of Aeronautics and Astronautics.

Wade has a Bachelor of Science degree in Aeronautical Engineering from the University of Texas, and has a Master's degree in the subject from Southern Methodist University.

He is married to the former Janet Wallrath, also of San Antonio. They have three children.



(713/483-5111)

NATIONAL AERONAUTICS AND SPACE ADMINISTRATION

Manned Spacecraft Center Houston, Texas 77058

FOR RELEASE:

UPON

RECEIPT

TEST BED CONTRACTS AWARDED

The National Aeronautics and Space Administration has signed development contracts valued at nearly \$200,000, with two aerospace industries for preliminary design of a test bed to study thermal materials that might be used on the Orbiter vehicle of the Space Shuttle.

Industries winning the awards are the North American Rockwell Corporation. Space Division, Downey, California, in the amount of \$99,000, and the Grumman Aerospace Corporation, Bethpage, Long Island, New York, in the amount of \$92,000.

The awards are part of a continuing allocation of technology funds to study the most effective systems to use for Shuttle development once the program is full underway.

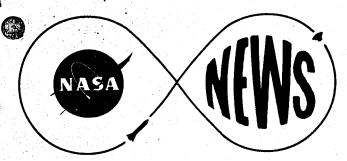
In this study of a test bed design, the contractors are requested to develop test objectives, design requirements, prepare preliminary design, study alternate concepts and -- finally -- recommend a test program.

The contract will run for approximately five months. It was awarded by the Structures and Mechanics Division of the Manned Spacecraft Center.

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December 7, 1971



Manned Spacecraft Center Houston, Texas 77058

FOR RELEASE:

UPON

RECEIPT

Don J. Green (713/483-5111)

RELEASE NO: 71-93

DR. CHRISTOPHER C. KRAFT, JR. GOES TO MOSCOW

Dr. Christopher C. Kraft, Jr., Deputy Director of the Manned Spacecraft Center, formerly of Phoebus, Virginia, has been named to the official party which meets with Soviet counterparts in Moscow, November 29 through December 7. The meeting is a continuation of technical discussions on the compatibility of rendezvous and docking of manned spacecraft.

These discussions are the third between the two countries on this subject. In late October 1970, five National Aeronautics and Space Administration representatives went to the USSR for preliminary talks, and a Soviet delegation visited the Houston space center this year from June 21 to 25.

Dr. Kraft has had an illustrious career in the US space program. Prior to his November 26, 1969, appointment to the position of Deputy Director, he was the Director of Flight Operations at MSC; having held that position since November 1963.

In the course of his career, Dr. Kraft has been accorded numerous honors. He was selected as one of the 100 outstanding young leaders in the nation by the editors of Life Magazine in September 1962. He received the Arthur S. Fleming Award in 1963 as one of the ten outstanding young men in government career service. In May of the same year, Dr. Kraft received the NASA Outstanding Leadership Award. Making the award was John F. Kennedy, president of the United States.

The NASA Distinguished Service Medal has been presented to Dr. Kraft twice -- in January and again in October, 1969.

He has been elected a Fellow of the American Institute of Aeronautics and Astronautics, and also of the American Astronautical Society. In June 1967, Dr. Kraft was voted the "Virginian of the Year" by the Virginia Press Association.

He holds honorary Doctor of Engineering degrees from the Indiana Institute of Technology, Fort Wayne, Indiana, and from St. Louis University, East St. Louis, Illinois. In addition, he was awarded the Di stinguished Alumnus Citation from Virginia Polytechnic Institute in 1965 -- the highest award granted by that institution.

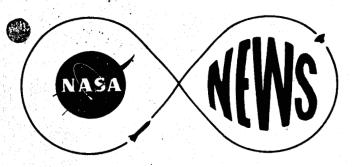
Dr. Kraft entered the federal service in 1945 as a member of the National Advisory Committee for Aeronautics. In October 1958, he was selected as one of the original members of the Space Task Group -- the organization was established to manage Project Mercury, this nation's first space program.

Dr. Kraft is married to the former Elizabeth Turnbull of Hampton, Virginia.

They have two children and currently reside in Friendswood, Texas.

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December 8, 1971



Manned Spacecraft Center Houston, Texas 77058

FOR RELEASE: 12/13/71

Terry White (713/483-5111)

Release No: 71-94

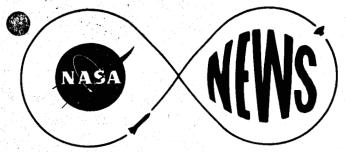
HOLIDAY TOUR SCHEDULE

The NASA Manned Spacecraft Center will be closed Christmas and New Years' days to visitors.

Self-guided tours for the general public will be on the normal schedule the days before and after each holiday -- December 24 and 26, and December 31 and January 2 -- from 9 a.m. to 4 p.m.

- end -

December 13, 1971



Don J. Green (713/483-5111)

RELEASE NO: 71-95

NATIONAL AERONAUTICS AND SPACE ADMINISTRATION

Manned Spacecraft Center Houston, Texas 77058

FOR RELEASE: UPON

RECEIPT

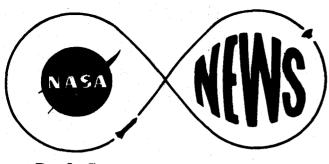
MSC AWARDS CEREMONIES

Dr. Robert R. Gilruth, Director of the NASA Manned Spacecraft Center, on December 14, will present awards to 80 MSC employees, to contractors and to 11 Center organizations for outstanding space contributions during 1971.

Superior Achievement Awards will go to 57 NASA personnel, while another 23 will receive Certificates of Commendation. The General Electric Company, Houston operations, and Kelsey-Seybold Clinic, also Houston, will be awarded Certificates of Appreciation.

The 11 MSC organizations who will receive NASA Group Achievement Awards are: the Crew Training and Simulation Team, J Mission Spacecraft Development Team, Mapping Sciences Team, Lunar Surface Experiments Team, Thermochemical Team, Thermal Vacuum Team, Lunar Quarantine Operations Team, White Sands Test Facility, MSC Fire Prevention Group, Modular Equipment Transporter Team, and the Apollo group located at Bethpage, Long Island, New York.

MSC Deputy Director Christopher C. Kraft, Jr., will assist in the presentation of awards. The Master of Ceremonies is Frank Bogart, Associate Director of MSC.



NATIONAL AERONAUTICS AND SPACE ADMINISTRATION
Manned Spacecraft Center
Houston, Texas 77058

FOR RELEASE: UPON RECEIPT

Don J. Green (713/483-5111)

RELEASE NO: 71-96

NASA RELEASES SHUTTLE SIMULATOR STUDY RFP

The National Aeronautics and Space Administration today asked aerospace firms for proposals to conduct a design study leading to the development of mission simulators for the Space Shuttle.

The request was issued by NASA's Manned Spacecraft Center.

In its instructions to industry, MSC calls for an effort which will result in three definitive summary reports.

The first report will acquire information on techniques, systems, and equipment which might be applied in the development of mission simulators.

Report number two will include analysis of visual systems and techniques, and the third report is to be a design study for the recommended systems. Specifications and cost figures also are required, according to the Request for Proposal (RFP).

The contractor is requested to study development simulators capable of ten different mission phases including:

- 1. Simulation of a vertical launch of mated Booster and Orbiter.
- 2. Capability of Orbiter insertion through a range of 50 to 500 nautical miles (92.6 to 926.0 kilometers).
- 3. Booster re-entry from 300,000 feet (91,440 meters).

- 4. Orbiter re-entry from 300,000 feet (91,440 meters).
- 5. Booster approach and landing capability under all conceivable flight conditions.
- 6. Simulation of Orbiter approach and landing capability under all flight conditions.
- 7. Orbiter rendezvous and dock with Space Station.
- 8. Horizontal take-off and ferry capability by Orbiter.
- 9. Simulation of Booster abort conditions, and
- 10. Simulation of Orbiter abort conditions.

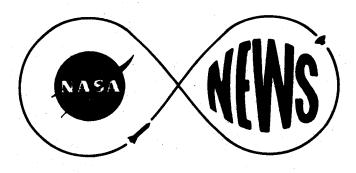
For study purposes, two cockpit cabins will be developed. One is for the Booster; the other for Orbiter. Each cockpit will be mounted upon a moving base to aid in motion simulation and each cabin will accommodate two crewmen.

The Space Shuttle is planned for use in the late 70's to transport personnel and cargo to and from low Earth orbit. Concepts call for a Booster and Orbiter which will be launched vertically in a piggy-back arrangement.

They will separate at approximately 200, 000 feet (60, 960 meters) altitude with the workhorse Booster returning immediately to Earth and the sleek Orbiter continuing onward into space.

The study will be accomplished under a firm-fixed price contract. Proposals are to be submitted by January 10, 1972, and the work will be concluded approximately 12 months after contract award.

It will be conducted under the direction of MSC's Crew Training and Simulation Division.



RELEASED AT NASA HEADQUARTERS

NATIONAL AERONAUTICS AND SPACE ADMINISTRATION

Manned Spacecraft Center Houston, Texas 77058

FOR RELEASE: SUNDAY,

December 19, 1971

APOLLO 16 COSMIC RAY DETECTOR

Information on the origin and chemical nature of cosmic rays is expected to be provided by a new experiment to be flown to the Moon aboard the Apollo 16 spacecraft in March, 1972.

Cosmic rays are atomic nuclei that travel through space at nearly the speed of light and continuously bombard Earth's atmosphere from every direction. The experiment cannot be performed on Earth since the Earth's magnetic field and gaseous atmosphere combine to absorb most of these potentially harmful particles before they reach the ground.

Analysis of the Apollo 16 cosmic ray experiment results is expected to provide data on the nature of low-energy, heavy cosmic ray particles (the nuclei of elements ranging from fluorine to zinc in the periodic table). Scientists believe that the chemical nature of many of these particles is changed little -- if at all -- during their journey through space. Thus, the study of the charge, mass, energy, and abundance of these particles should provide new information about the origin of the elements in the universe and the processes by which these elements are created within distant stars.

The Apollo 16 experiment also may answer a most important and puzzling question about cosmic rays: how old are they? If radioactive isotopes can be positively identified among the elements in the flux of primary cosmic rays, it will be possible to determine the age of these isotopes. For example, if the detectors can resolve Aluminum²⁷ -- and if an appreciable number of aluminum nuclei are recorded -- then these cosmic ray nuclei must be less than a few million years old and must have originated within our own Milky Way galaxy.

The Apollo 16 array of detectors includes various materials such as plastics, glasses, and minerals to record the tracks of these cosmic rays. Each element in the cosmic radiation leaves its own distinctive "fingerprint" in its track. As a cosmic ray passes through thin layers of plastic, for example, it will create a trail of damage less than a millionth of an inch wide. This track can be enlarged for study by chemically etching the plastic sheets. The etching solution dissolves the radiation damage and produces cone-shaped holes. The shape of the track tells what kind of particle made it.

The experiment's glass samples are specially suited to the identification of rare, ultraheavy, low-energy nuclei. Included in the glass samples will be a thin section sliced from a tektite, a glassy rock found in large numbers in certain limited areas of the Earth. The origin of tektites is unknown. By subjecting the tektite samples to cosmic rays, calibration data may enable scientists to determine whether tektites experienced a cosmic ray exposure of seconds to minutes (implying an origin on Earth) or a few days (implying an origin on the Moon).

The detector array will be fabricated mainly of thin sheets of plastic, particularly Lexan polycarbonate resin, a high-impact strength material that is particularly sensitive to cosmic rays.

Other plastics used include cellulose triacetate for studying low-energy, medium and heavy cosmic ray particles and cellulose acetate butyrate for measuring thermal neutrons created by the impact of galactic cosmic rays against the Moon's surface.

The detectors also will contain mineral samples and strips of metal foil and metal-coated film to measure low-energy, heavy cosmic ray particles and light solar wind particles.

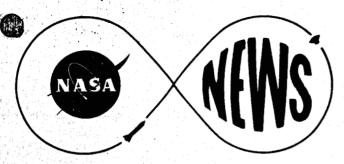
The detector array consists of four panels, each of which is fastened to its neighbor by a hinge. During the voyage to the Moon, the array will be attached to the exterior of the lunar module. At the end of the final 'Moon walk" by the Apollo 16

astronauts, the detector array will be detached from the lunar module and returned to Earth.

Principal investogators for the experiment are Dr. Robert L. Fleischer, General Electric Research and Development Center, Schenectady; Dr. P. Buford Price, Professor of Physics, University of California at Berkeley; and Dr. Robert M. Walker, Professor of Physics at Washington University.

- end -

December 14, 1971



Manned Spacecraft Center Houston, Texas 77058

FOR RELEASE:

UPON RECEIPT

Don J. Green (713-483-5111)

RELEASE NO: 71-98

RADNOFSKY RECEIVES COMMENDATION CERTIFICATE

Matthew I. Radnofsky, formerly of Boston, Massachusetts, but now employed at the National Aeronautics and Space Administration's Manned Spacecraft Center, was awarded a Certificate of Commendation for his work during 1971 on fire resistant materials.

Radnofsky's certificate reads:

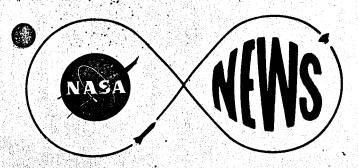
"For his outstanding contributions and personal dedication to the application of fire resistant, nonmetallic materials technology within the space program and to other aerospace and commercial activities."

"Largely through his efforts many fire resistant materials applications have been identified and implemented for spacecraft, aircraft, protective clothing, structures, and facilities. His efforts in this field promise to yield one of the more significant contributions of NASA technology to other areas of our society."

Dr. Radnofsky is Chief of MSC's Crew Equipment Branch and in that office has supported many of the Apollo moon flights.

He has a Bachelor of Arts degree in Physical and Biological Sciences and a Master of Arts degree in Physiology, both from Boston University. In addition, in 1967, he was awarded an Honorary PhD from the University of Taiwan.

He is married to the former Eunice Eisenberg. They have four children and currently reside in Seabrook, Texas.



Manned Spacecraft Center Houston, Texas 77058

FOR RELEASE:

UPON RECEIPT

Don J. Green (713/483-5111)

RELEASE NO: 71-99

NESHYBA EARNS PRESIDENTIAL CITATION

Victor P. Neshyba of the National Aeronautics and Space Administration's Manned Spacecraft Center has received a 1971 Presidential Management Improvement Certificate, accompanied by a letter from President Richard M. Nixon.

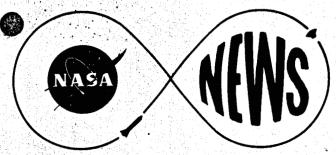
Neshyba is the only individual in NASA to win such an award this year. He was honored for his development of a new procedure for data redundancy removal that will save the government over \$3 million.

The certificate, signed by President Nixon, reads "for excellence in improvement in government operations. The noteworthy efforts and intense dedication required for this achievement exemplify the high performance needed to keep our country strong."

Earlier in 1971, he received an MSC Cost Reduction Award for his work in devising more efficient methods for transmitting, storing, and reducing data which comes from spacecraft during missions.

Mr. Neshyba is assigned to MSC's Space Shuttle Program Office. He joined NASA in 1962.

He and his wife Mary, residents of Dickinson, Texas, have nine children.



Don J. Green (713/483-5111)

RELEASE NO: 71-100

NATIONAL AERONAUTICS AND SPACE ADMINISTRATION

Manned Spacecraft Center Houston, Texas 77058

FOR RELEASE:

UPON RECEIPT

ZEDEKAR RECEIVES COMMENDATION CERTIFICATE

Raymond G. Zedekar, formerly of South Haven, Michigan, but now employed at the National Aeronautics and Space Administration's Manned Spacecraft Center, was awarded a Certificate of Commendation for his work during 1971 on the Apollo lunar missions.

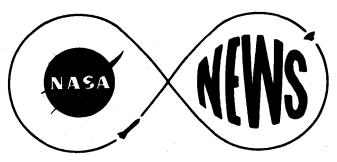
Zedekar's certificate reads: "In recognition of his outstanding contributions to the success of the Apollo 15 lunar landing mission. His skill in developing lunar surface procedures and crew training in deployment and activation of scientific instruments, geology sampling, and use of the lunar roving vehicle led to maximum scientific return from the three lengthy traverses on the lunar surface."

"As lunar surface activities officer, he provided real-time guidance to the crew in resolving problems encountered during their lunar surface excursions, and his efforts contributed significantly to the successful accomplishment of the first truly scientific expedition to the moon."

Mr. Zedekar is a training assistant working with spacemen assigned to fly missions to the Moon. He has been with NASA since 1959.

He has a Bachelor of Science Degree in Mechanical Engineering from the University of Virginia.

Zedekar is married to the former Shelby Ann Woodson of Charlottesville, Virginia. They have two children and are residents of Houston.



Robert V. Gordon (713/483-5111)

RELEASE NO: 71-101

NATIONAL AERONAUTICS AND SPACE ADMINISTRATION

Manned Spacecraft Center Houston, Texas 77058

FOR RELEASE: 12/23/71

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NASA-CLEAR LAKE AGREEMENT

The National Aeronautics and Space Administration - Manned Spacecraft Center and the Clear Lake City Water Authority jointly announced today that they have entered into a long term contract whereby the Clear Lake City Water Authority would provide treatment of MSC's wastewater. The Clear Lake City Water Authority's treatment facility is located approximately 300 feet from the MSC boundary, and a pipeline is to be built between the two facilities.

In August 1970, the Texas Water Quality Board issued Order No. 69-9A which will require all Clear Lake waste dischargers to either divert effluent from Clear Lake, or to upgrade treatment of effluent by August 1972. In addition, the President, through Executive Order 11507 dated February 5, 1970, notified federal installations of a requirement to meet more stringent effluent standards. As a result, MSC had initiated plans to upgrade its sewage treatment facilities. However, in March 1971, the Clear Lake City Water Authority proposed that it provide the advanced treatment of MSC wastewater as required by the Texas Water Quality Board and the Environmental Protection Agency.

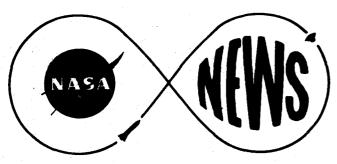
Both federal and state pollution regulatory agencies have endorsed the Clear Lake City Water Authority proposal and recommend the expanded use of municipal or regional facilities for the purpose of reducing water pollution. A stated long range goal of the Texas Water Quality Board is to ultimately divert all effluent from Clear Lake and the contract between MSC and the Clear Lake City Water Authority will facilitate the accomplishment of this goal.

Even though MSC must install a connecting pipeline, there will be a considerable cost savings by not having to improve the existing MSC treatment facilities. It is also anticipated, because of a higher processing volume, that the operating costs to jointly process MSC and Clear Lake City wastewater will be significantly less than if each proceeded on an independent basis.

The Clear Lake City Water Authority has initiated a plan to meet the more stringent effluent standards by upgrading its treatment facility. The new treatment process will be operational by the deadline of August 1972. Matching federal and state funds have been requested to finance this project.

- end -

December 23, 1971



Manned Spacecraft Center Houston, Texas 77058

FOR RELEASE:

12/23/71 10:30 a.m.

Robert V. Gordon (713/483-5111)

RELEASE NO: 71-102

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KING NAMED MSC-PUBLIC AFFAIRS OFFICER

John W. (Jack) King has been appointed Public Affairs Officer at the National Aeronautics and Space Administration's Manned Spacecraft Center, Houston, Director Dr. Robert R. Gilruth announced today.

King, who has been Chief of Public Information at the NASA Kennedy Space Center, Florida, for the past 11 years, will assume the position effective late January, 1972.

At KSC, King has been responsible for news media activities concerning launch operations conducted by NASA at the Kennedy Space Center and Cape Kennedy Air Force Station.

During the period he has participated in more than 200 launches, including all the manned space flight programs in Projects Mercury, Gemini and Apollo.

King, 40, is a native of Boston, Mass. He is a 1953 graduate of Boston College, where he received a Bachelor of Arts degree in English. He served as an Army artillery officer in Korea and Japan.

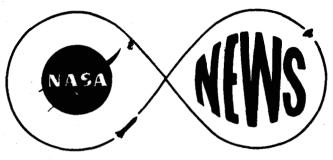
Following his military tour of duty, King joined the Associated Press wire service in Boston in 1955. Prior to his assignment with NASA, he had served as the first Associated Press bureau chief at the then Cape Canaveral in 1958.

He was awarded the NASA Exceptional Service Medal in 1969, for his participation in the Apollo program and was named recipient of the Lawrence Award by the Aviation/Space Writers Association as the outstanding government civilian public information officer in 1968.

King and his wife Evelyn have three children, Chip 13, Elizabeth 4 1/2 and William 2.

- end -

December 23, 1971



RELEASED AT NASA HEADQUARTERS

NATIONAL AERONAUTICS AND SPACE ADMINISTRATION

Manned Spacecraft Center Houston, Texas 77058

FOR RELEASE:

December 27, 1971

Richard Friedman (202/755-3897)

RELEASE NO: 71-103

NASA AND SOVIET MEDICAL AGREEMENT

The National Aeronautics and Space Administration and the Soviet Academy of Sciences have agreed on the substance and mechanics of future exchanges of medical and biological data on their experience in manned space flight.

The details of the recently approved agreement are contained in recommendations of a joint working group on space biology and medicine which met in Moscow October 9-13, pursuant to the agreement of January 21, 1971, between NASA and the Academy of Sciences of the USSR on space cooperation.

The Joint Working Group began an examination of selected biomedical data and the results of manned flight programs and exchanged reports on the Soyuz and Apollo programs. Special consideration was focused on the following aspects of the biomedical results of manned flight: the cardiovascular system, metabolism, water-electrolyte exchange, statokinetic apparatus performance, vestibular apparatus and biological research.

In the interest of expanded and more regular exchange of space biomedical data, the working group recommended that meetings be held at least once a year or more frequently should the need arise. These meetings will include the exchange of pre-, post- and inflight data in sufficient detail to assure a full understanding of the flight experience of each country from a physiological and medical viewpoint. Directly related research will also be discussed when it is pertinent.

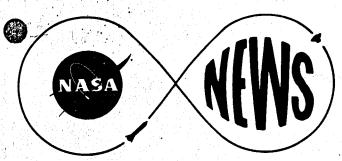
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The working group also recommended that working sessions be held at which experts would consider such topics as:

- -- Methods of predicting the state of the human organism during and after space flights with a view to developing common predictions.
- -- Response of the following systems to the space flight environment: cardiovascular, endocrine, fluid and electrolyte balance and central nervous.
- -- Techniques of dysbarism prevention in crew members applicable to various decompression condition.
- -- Methods of pre- and postflight medical observations of flight crew members with a view to proposing common usage.
- -- Objectives, methods, and results of biological experiments, including developmental and genetic research, with a view to coordinating US and Soviet programs.

The joint working group recommended that the next meeting be held in May 1972, in the US to consider, in addition to flight data, methods of predicting the state of the human organism during and after space flights, methods of preand postflight medical observations of flight crew members and recommendations to achieve the consistent use of terminology. It also recommended that the co-chairmen explore the possibility of an exchange of one or two appropriate specialists to work in laboratories doing similar biomedical research in space programs of the US and the USSR.

Co-chairmen of the Working Group are Dr. Charles A. Berry, NASA Director for Life Sciences, and Dr. N. N. Gurovskiy of the USSR Ministry of Health and the Academy of Sciences.



Robert V. Gordon (713/483-5111)

RELEASE NO: 71-104

NATIONAL AERONAUTICS AND SPACE ADMINISTRATION

Manned Spacecraft Center Houston, Texas 77058

FOR RELEASE: 12/29/71

MSC WELCOMES ONE MILLIONTH VISITOR

Mr. and Mrs. Willard Andrews and their family were the one millionth visitors to the Manned Spacecraft Center in 1971. They visited MSC on December 29, during their first trip to Houston.

The Andrews family is from Oskaloosa, Iowa. Included in the group besides Mr. and Mrs. Andrews were their daughter Judy, a second grade teacher; daughter Barbara (Mrs. Don Messer), a fifth grade teacher; and son-in-law, Reverend Don Messer. The Messer's live in Oleda, Illinois. Mr. Andrews is a salesman.

The family was escorted on a special tour of the Center and given information packages including pictures and brochures.

This is the second year in a row MSC has recorded in excess of one million visitors.

- end -

December 29, 1971

Picture

From Left to Right Mr. Andrews, Mrs. Andrews, Judy Andrews, Barbara and Don Messer, and Bill Wicklund of Visitor Services.

The group is pictured at the base of a full size lunar landing module on display in the visitor center at the Manned Spacecraft Center.